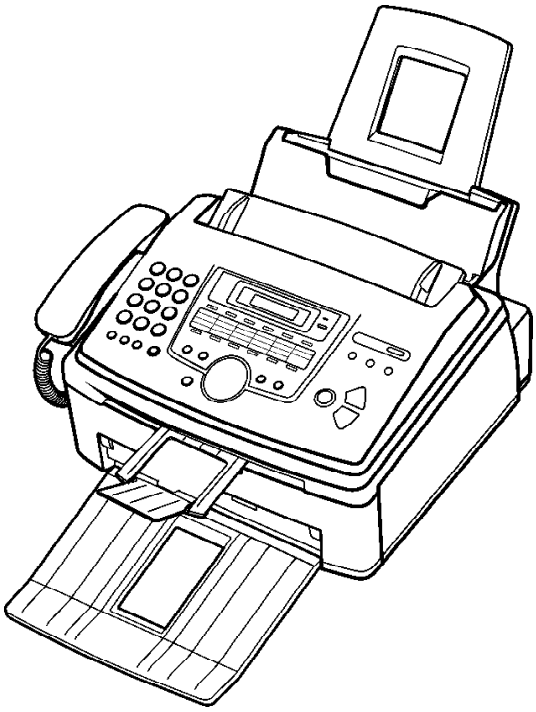
ORDER NO. KMF0308685C1
F7

High Speed Laser Fax and Copier

KX-FL541

(for U.S.A.)



Panasonic

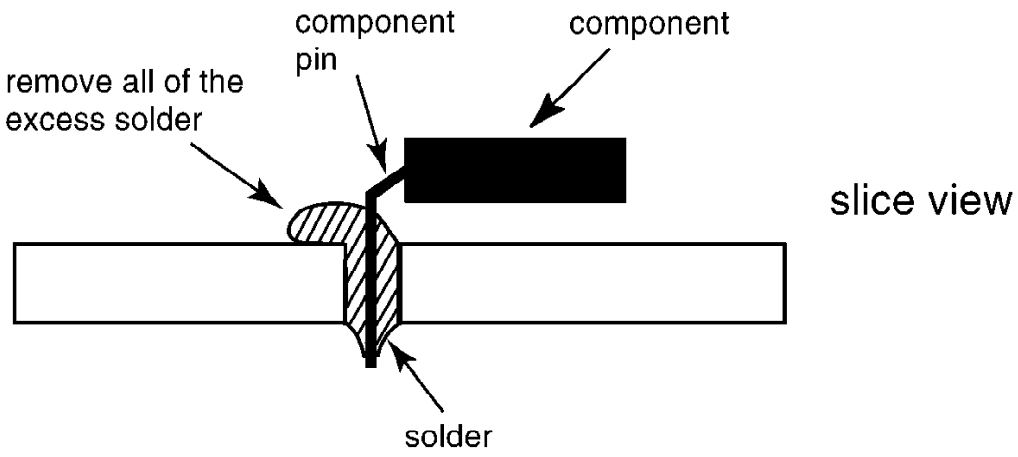
1. INTRODUCTION

1.1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.
We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

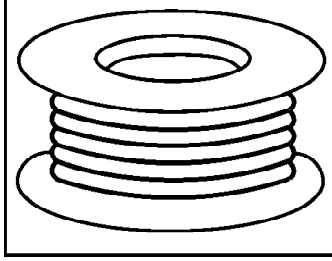
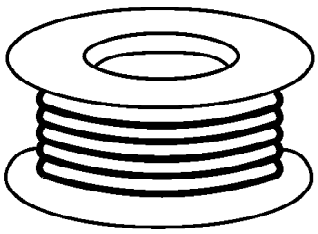
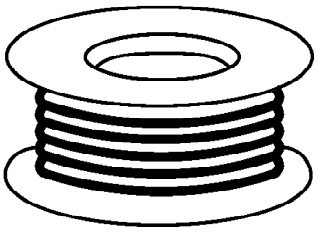
Caution

- **PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.**
- **PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).**
- **If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.**
- **When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).**



1.1.1. SUGGESTED PBF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper,
(Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufac-
turer's specific instructions for the melting points of their products and any precautions for using their product with other
materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.2. HOW TO RECOGNISE THAT Pb FREE SOLDER IS USED

P.C.Boards marked as "PbF" use Pb Free solder. (See the figure below.)
Pb Free is not used the Power Supply Board of this unit.
(Example :Digital board)

Note : The "PbF" marked may be found on different areas of the same P.C.Board,depending on manufacture date.

1.3. SAFETY PRECAUTIONS

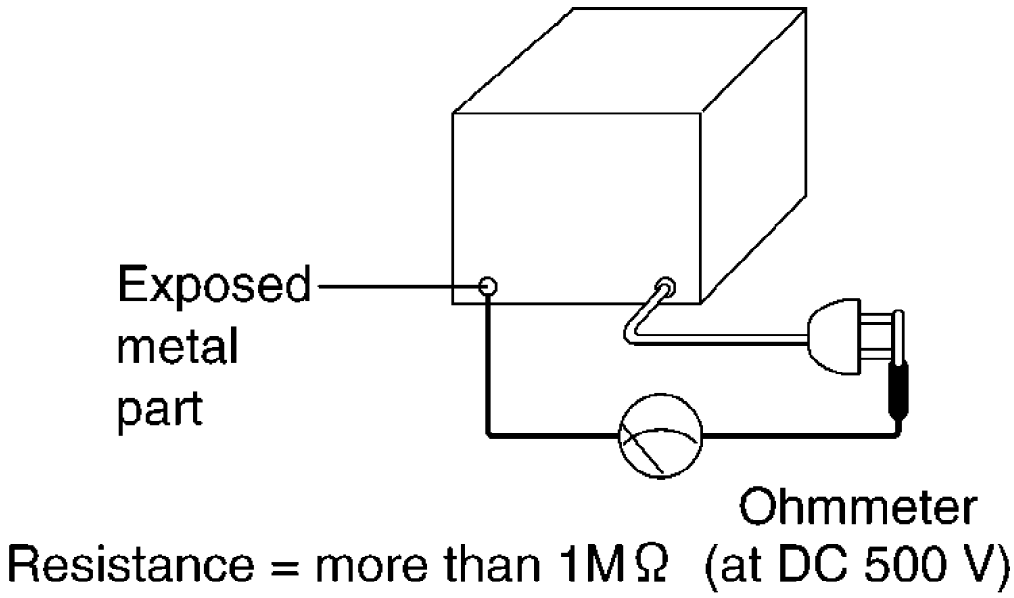
1. Before servicing, unplug the AC power cord to prevent an electric

shock.

2. **When replacing parts, use only the manufacturer's recommended components.**
3. **Check the condition of the power cord. Replace if wear or damage is evident.**
4. **After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.**
5. **Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.**

1.4. INSULATION RESISTANCE TEST

1. **Unplug the power cord and short the two prongs of the plug with a jumper wire.**
2. **Turn on the power switch.**
3. **Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).**
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. **If the measurement is outside the specified limits, there is a possibility of a shock hazard.**



1.5. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic part's boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

1.6. BATTERY CAUTION

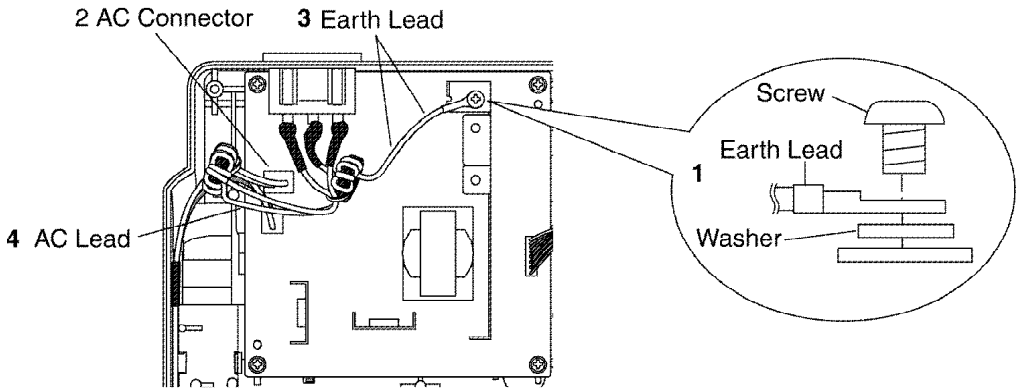
CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution :
Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.
Recommend Type Number:
CR-2032/V9A (BAT600) Manufactured by MATSUSHITA

1.7. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

1. The earth lead is fixed with the screw.
2. The AC connector is connected properly.
3. Wind the earth lead around the core 4 times.
4. Wind the earth AC around the core 4 times.

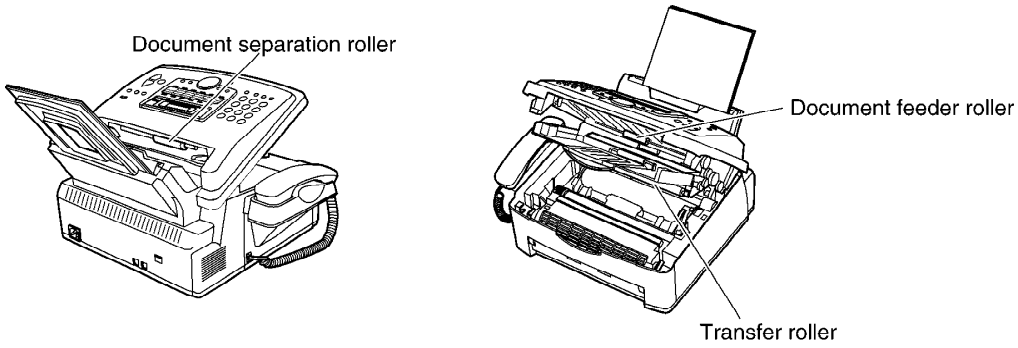


1.8. PERSONAL SAFETY PRECAUTIONS

1.8.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.

The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.

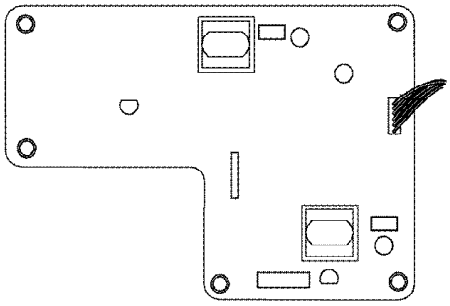


1.8.2. LIVE ELECTRICAL SECTIONS

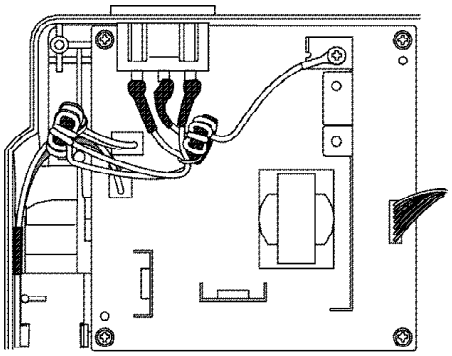
All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.



High Voltage power Supply board

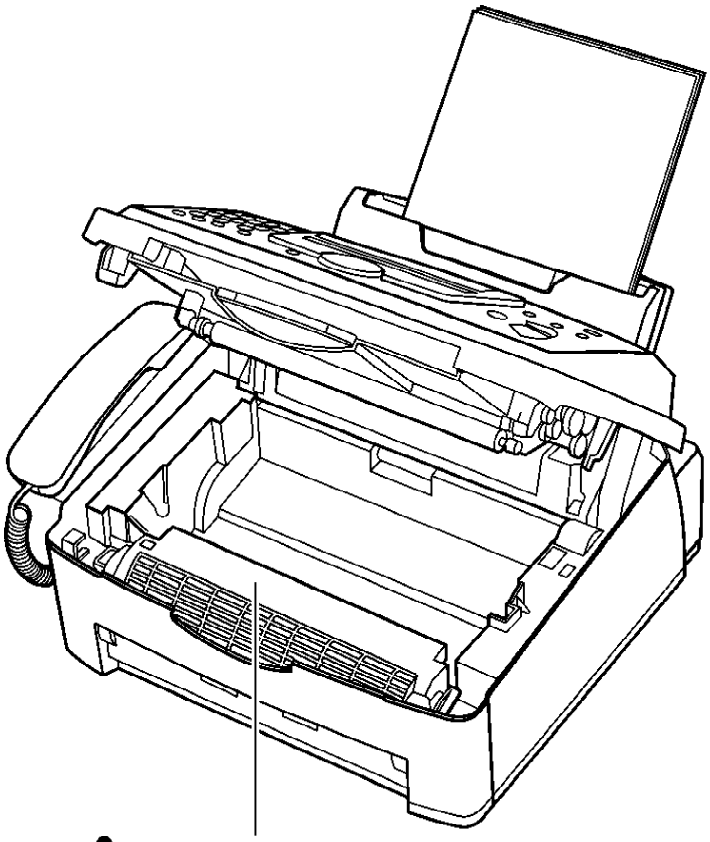


Low Voltage power Supply board

1.8.3. LASER BEAM AND FUSER UNIT SECTION

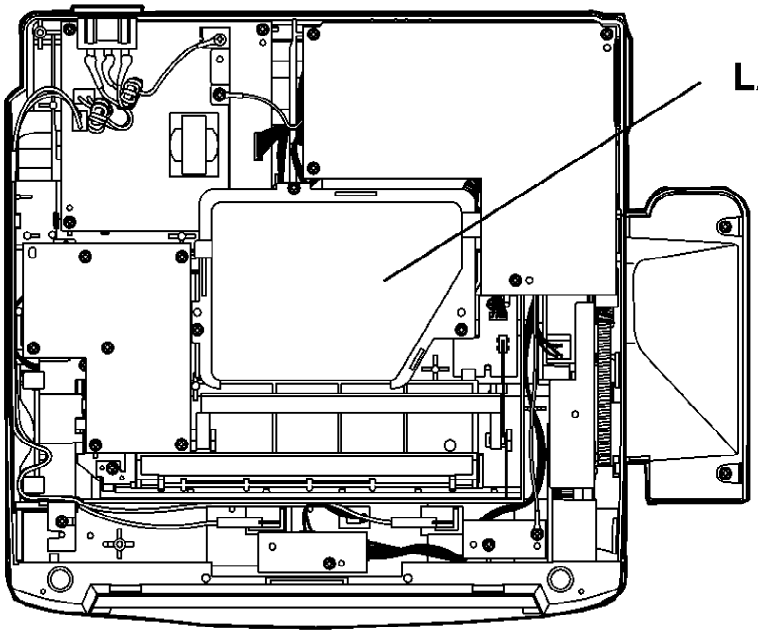
- The printer of this unit utilizes a laser. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

- The fuser unit is inside of the unit and gets hot. Do not touch it when removing the jammed paper or cleaning the lower glass.



Fuser unit

The fuser unit gets hot. Do not touch it.

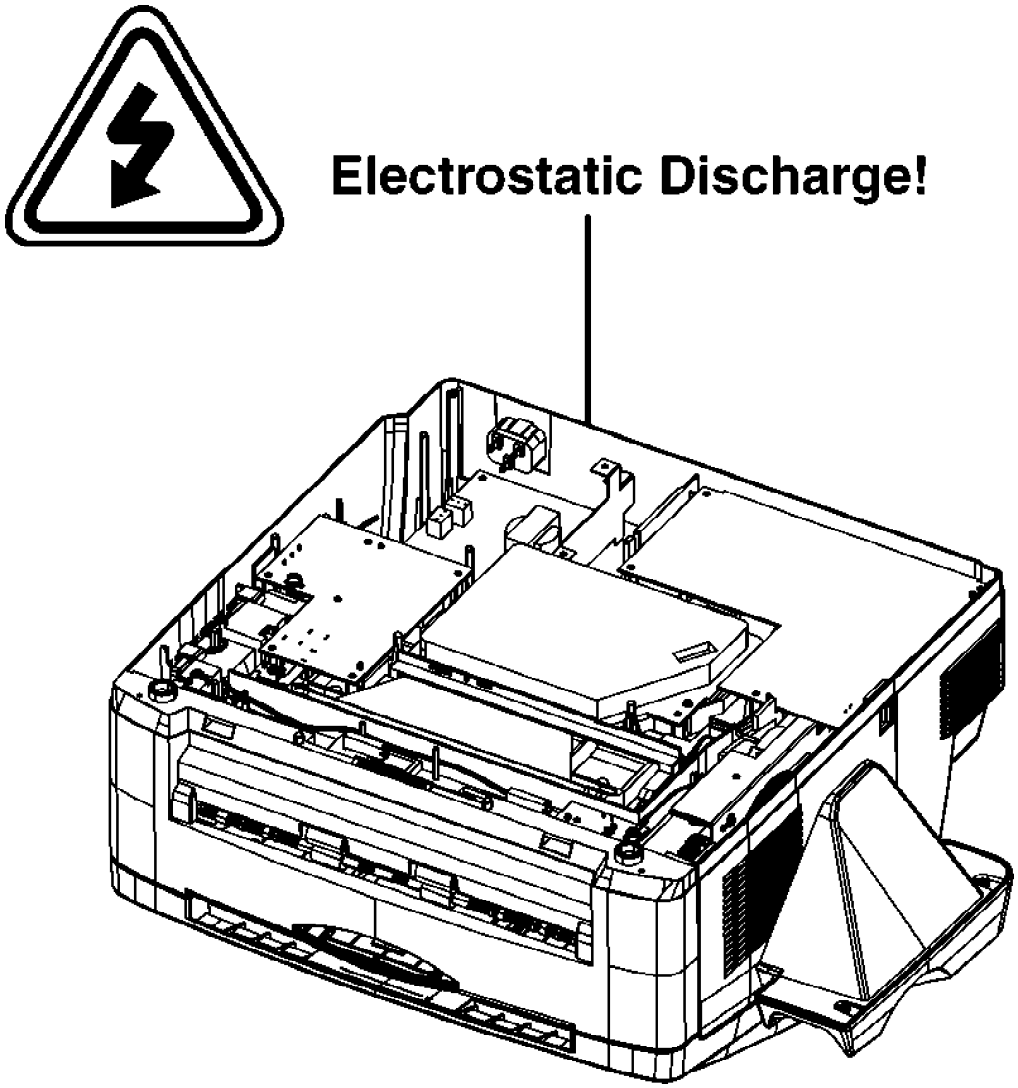


(BOTTOM VIEW)

1.9. SERVICE PRECAUTIONS

1.9.1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



1.10. FOR BEST PERFORMANCE

- To extend the life of the drum unit, the unit should never be turned OFF immediately after printing. Leave the power turned ON for a minimum of 30 minutes after printing.

- In the printing process, heat is used to fuse toner onto the page. As a result, it is normal for the machine to produce an odor during and shortly after printing. Be sure to use this unit in an area with proper ventilation.

- Do not cover slots or openings on the unit. Inspect the air circulation vents regularly and remove any dust build-up with a vacuum cleaner.
- If the inside of the unit is dirty, clean it with a soft and dry cloth (especially the lower glass).
- When replacing the toner cartridge or drum unit, do not allow dust, water, or liquids to come in contact with the drum. This may affect print quality.
- Store unused paper in the original packaging, in a cool and dry place. Not doing so may affect print quality.
- Do not place the unit in an area where the paper tray may be obstructed (i.e., by a wall,etc.).
- Keep the air circulation vents away from walls etc.more than 50 mm (1 31 / ") to let the unit cool down.

2. FEATURES AND SPECIFICATIONS

2.1. FEATURES

General

- Help function

  Display:

  1. BASIC SETTINGS
  2. FEATURE LIST
  3. DIRECTORY
  4. FAX SENDING / RECEIVING
  5. COPIER
  6. Q and A
  7. ERRORS
  8. REPORTS
  9. CALLER ID

- LCD (Liquid Crystal Display) readout
- TAM (Telephone answering machine) interface

Plain Paper Facsimile Machine

- Letter/A4/Legal, G3 compatible
- Automatic document feeder (20 sheets)
- Quick scan
- Resolution: Standard/Fine/Super fine/Photo/Photo with text. (64 level)

- STANDARD: For printed or typewritten originals with normal-sized characters.
- FINE: For originals with small printing.
- SUPER FINE: For originals with very small printing.
- PHOTO: For originals containing photographs, shaded drawing,etc.
- PHOTO WITH TEXT: For originals containing photograph and text.
- Broad cast
- 250-sheet paper capacity (60 g/m2~ 75 g/m2[16 lb~20 lb.])
- Distinctive ring detection.

Large Memory... Performed by DRAM
Approx. 341 pages of memory transmission
Approx. 512 pages of memory reception

Integrated Telephone System
- On-hook dialing
- Monitor speaker
- Voice muting
- Redialing function
- 122-Station telephone directory

Enhanced Copier Function
- Multi-copy function (up to 99 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone

2.2. SPECIFICATIONS

Applicable Lines:
Public Switched Telephone Network

Document Size:
Max. 216 mm (8 1/2”) in width
Max. 600 mm (23 5/8”) in length

Effective Scanning Width:
208 mm (8 3/16”)

Effective Printing Width:
A4 : 202mm
Letter/Legal : 208mm

Transmission Time*:

Approx. 4 s/page (ECM-MMR)**

Scanning Density:

Horizontal:
8 pels/mm (203 pels/inch)
Vertical:
3.85 lines/mm (98 lines/inch)-STANDARD
7.7 lines/mm (196 lines/inch)-FINE/PHOTO/PHOTO WITH TEXT
15.4 lines/mm (392 lines/inch)-SUPER FINE

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Laser printer

Data Compression System:

Modified Huffman (MH), Modified READ (MR), Modified, Modified READ (MMR)

Modem Speed:

33,600 / 31,200 / 28,800 / 26,400 / 24,000 / 21,600 / 19,200 / 16,800 / 14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback

Operating Environment:

10°C—32.5°C (50°F—90.5°F), 20—80% RH (Relative Humidity)

Dimensions (H×W×D):

220 mm × 430 mm × 360 mm (8 21/32”×16 15/16”×14 5/32”)

Mass (Weight):

Approx. 9 kg (19.8 lb.)

Power Consumption:

Standby: Approx. 3 W
Transmission: Approx. 11 W
Reception: Approx. 290 W
Copy: Approx. 290 W
Maximum: Approx. 900 W (When the fuser lamp turns on)

Power Supply:

120 V AC, 60 Hz

Memory Capacity:

Approx. 341 pages of memory transmission.
Approx. 512 pages of memory reception with back-up.
(Based on ITU-T No. 1 Test Chart in standard resolution.)

Laser diode properties:

Laser output: Max. 5 mW
Wave length: 760 nm—800 nm
Emission duration: Continuous

Print Speed:

Approx.14 ppm (page per minute)

Printing Resolution:

600 × 600 dpi

*** Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.**
**** Transmission speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to ITU-T No.1 TEST CHART().) If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.**

Note:

- **Any details given in these instructions are subject to change without notice.**
- **The pictures and illustrations in these instructions may vary slightly from the actual product.**

Design and specifications are subject to change without notice.

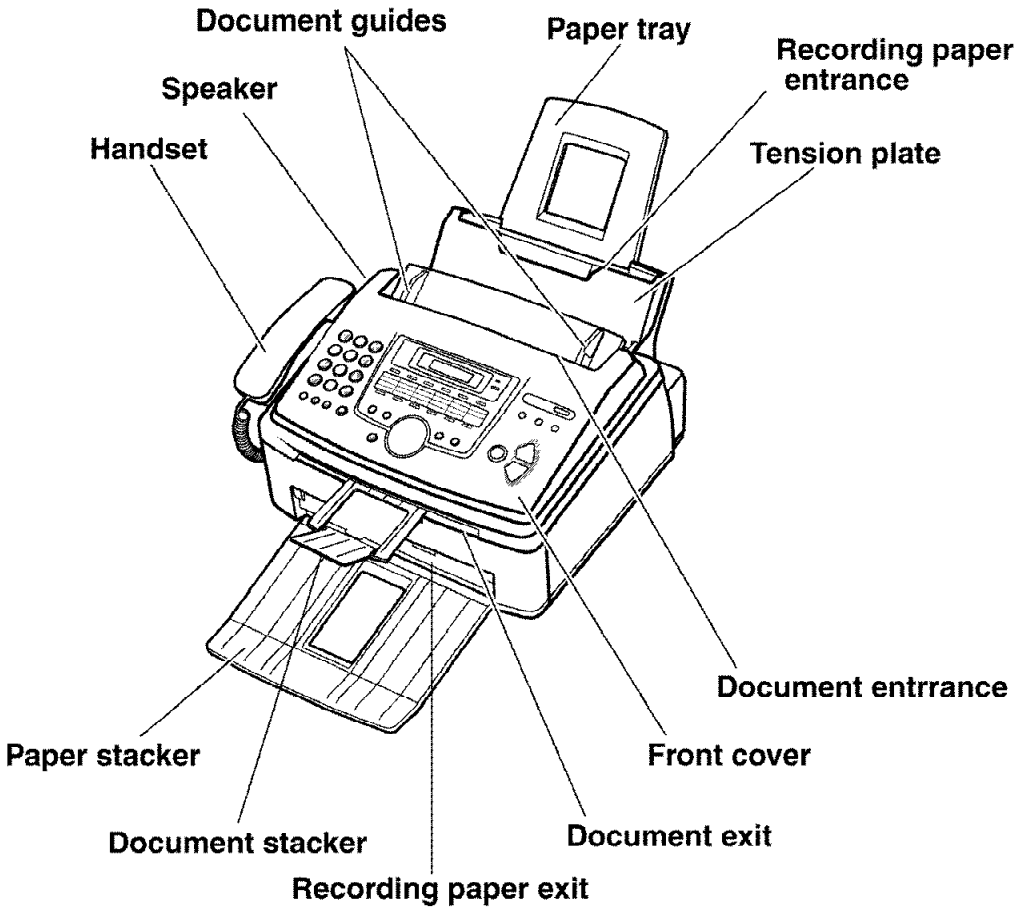
2.3. OPTIONAL ACCESSORIES

Model No.	Description	Specifications
KX-FA83	Toner cartridge	1 toner cartridge
KX-FA84	Drum unit	1 drum unit

3. INSTALLATION

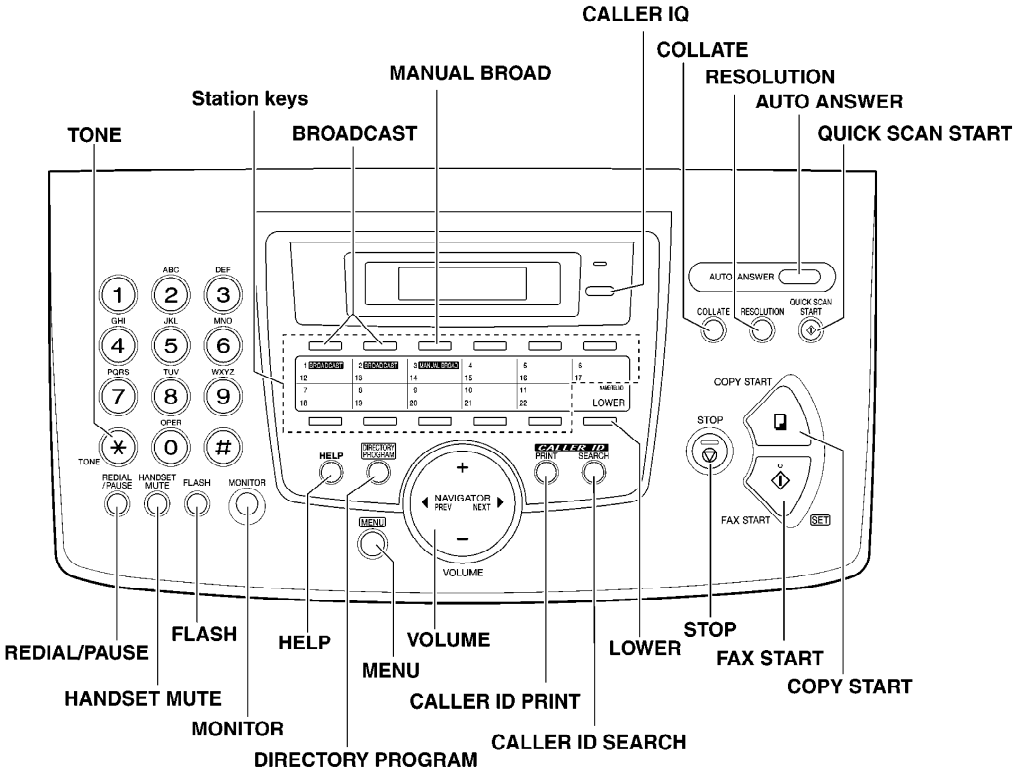
3.1. LOCATION OF CONTROLS

3.1.1. OVERVIEW



Note:
***The paper stacker may not be shown in all illustrations.**

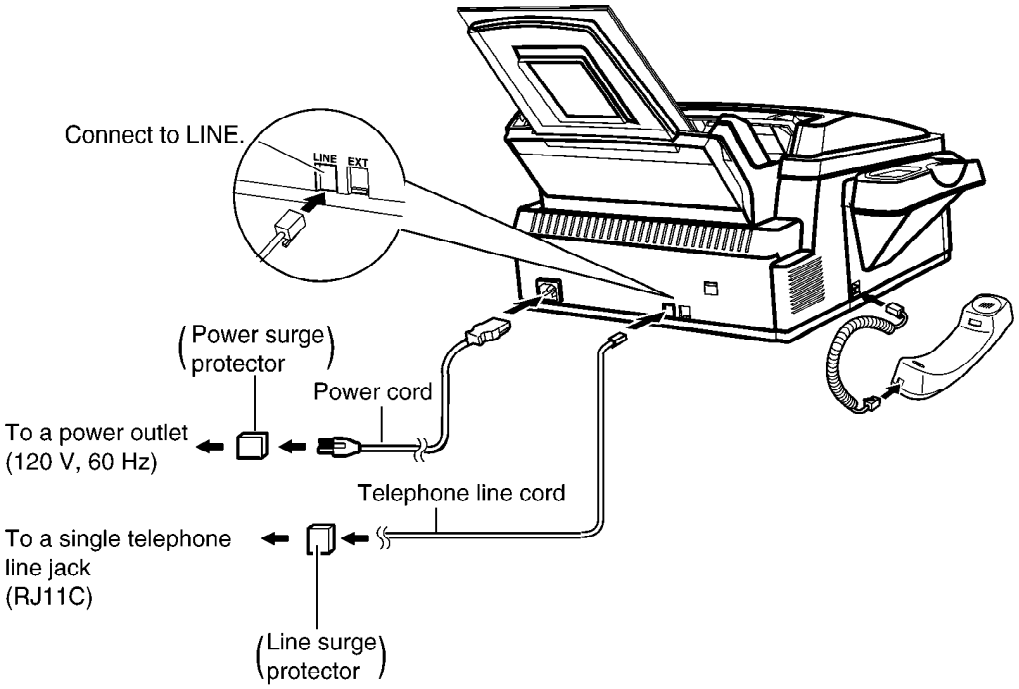
3.1.2. CONTROL PANEL



3.2. CONNECTIONS

(1) Connect the handset cord.
(2) Connect the telephone line cord.
(3) Connect the power cord.

- When the power is turned on for the first time, the unit will print some basic information.



Caution:

- When you operate this product, the power outlet should be near the product and easily accessible.

Note:

- The warranty does not cover damage due to power line surges or lightning. For additional equipment protection, we recommend the use of a surge protector. The following types are available: TELESPIKE BLOK MODEL TSB (TRIPPE MFG. CO.), SPIKE BLOK MODEL SK6-0 (TRIPPE MFG. CO.), SUPER MAX (PANAMAX) or MP1 (ITW LINX).

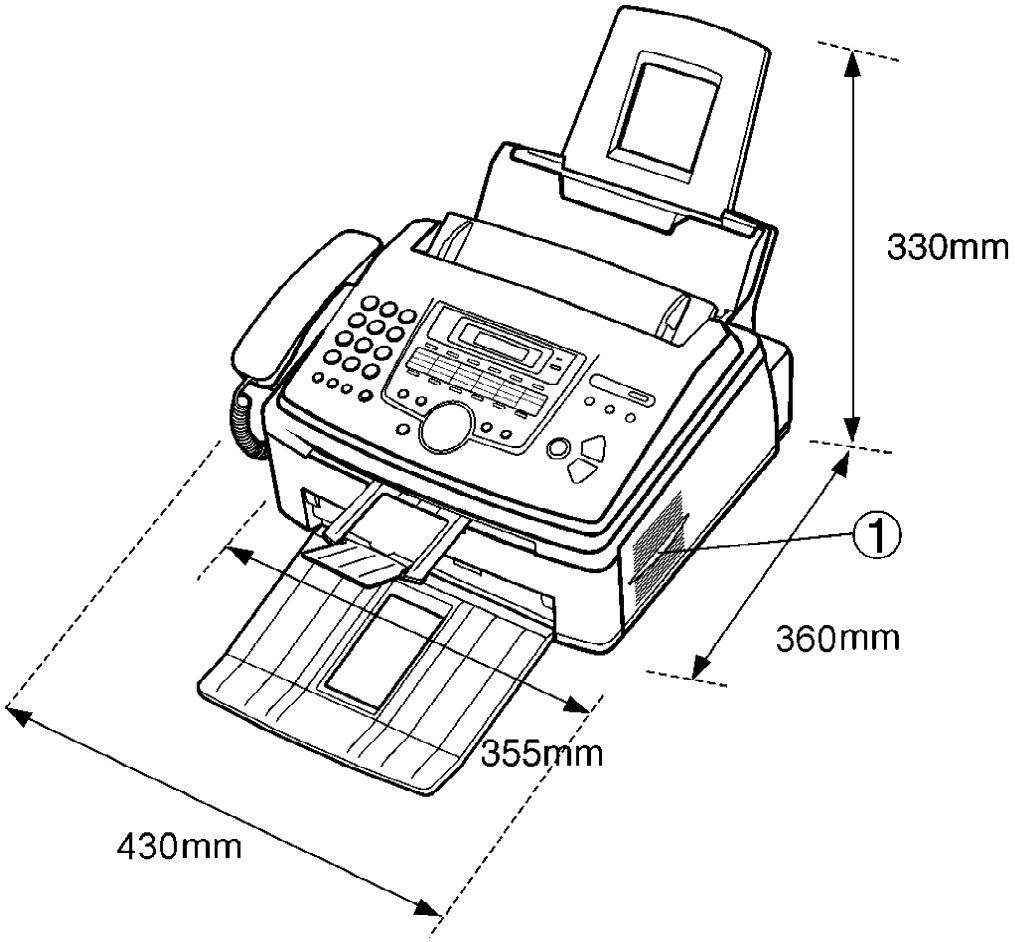
- To avoid malfunction, do not position fax machine near appliances such as TVs or speakers which generate an intense magnetic field.

- If any other device is connected on the same line, this unit may disturb the network condition of the device.

3.3. INSTALLATION

3.3.1. INSTALLATION SPACE

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently.



Note:

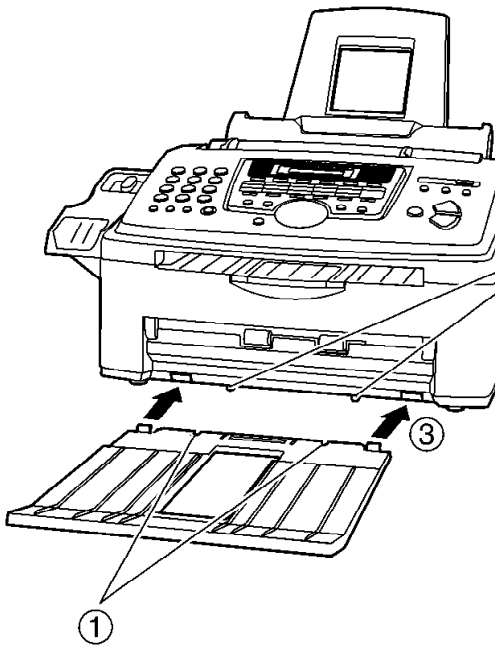
- Avoid excessive heat or humidity.
- Use the unit within the following ranges of temperature and humidity.
- Ambient temperature: 10°C to 32.5°C
- Relative humidity: 20% to 80% (without condensation)
- Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.
- Avoid direct sunlight.
- Do not install near devices which contain magnets or generate magnetic fields.
- Do not subject the unit to strong physical shock or vibration.
- Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.
- To protect the unit from damage, hold both sides when you move it.
- Do not place the unit in an area where the paper tray may be obstructed (i.e., by a wall, etc.)

- Keep this surface (①) away from walls etc. more than 50 mm (1 31/ 32”) to let the unit cool down.

3.3.2. PAPER STACKER

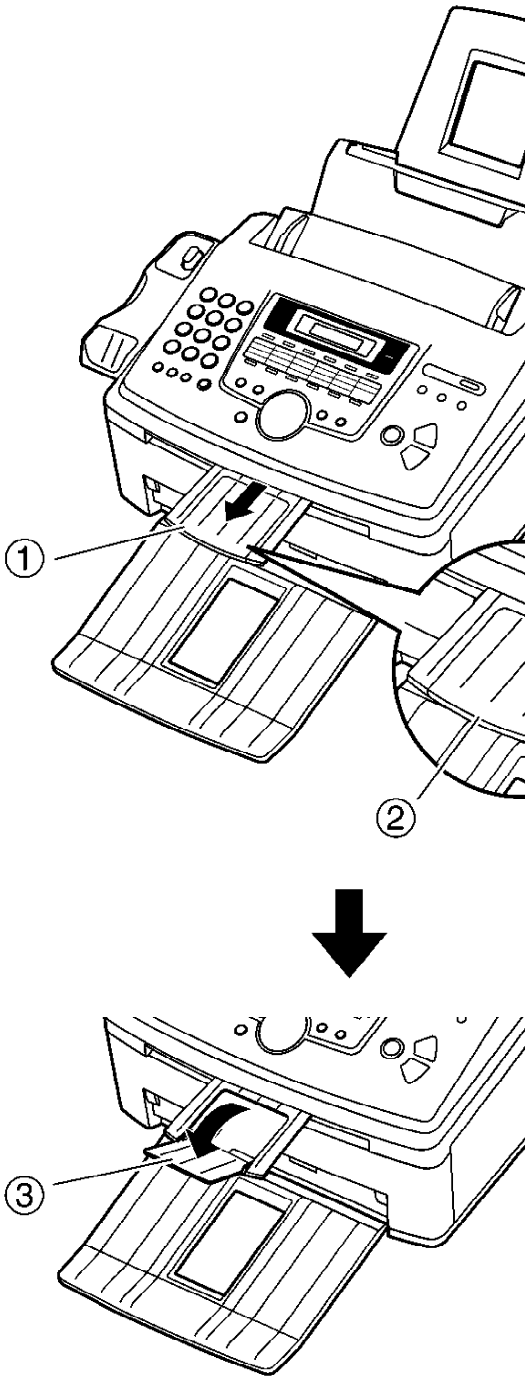
Line up the slots (①) in the paper stacker with the pegs (②) on the bottom of the unit, then insert the two tabs of the paper stacker into the slots on the unit (③).

-The paper stacker can hold up to approximately 100 sheets of printed paper. Remove the printed paper before the paper stacker becomes full.



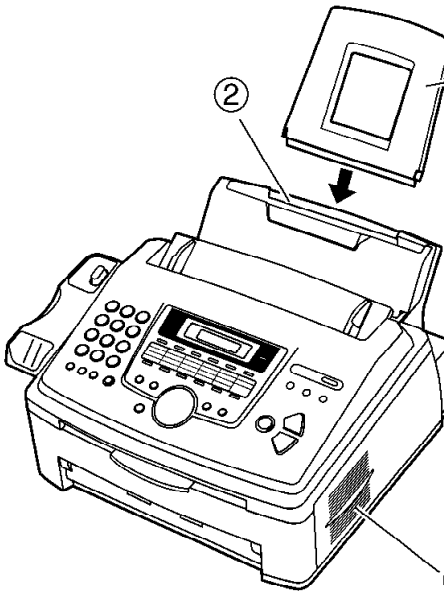
3.3.3. DOCUMENT STACKER

Pull the document stacker (①) forward gently until it clicks into place, then press the center part of the document stacker (②) to open the document stacker extender (③).



3.3.4. PAPER TRAY

Insert the paper tray (①) into the slot (②) on the back of the unit.



Note for installation:

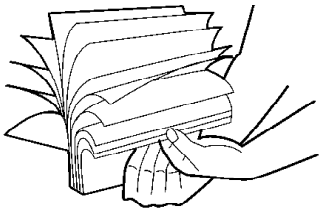
- **Do not place the unit in an area where the paper tray may be obstructed (i.e. by a wall etc.).**
- **Document and recording paper will be ejected from the front of the unit. Do not place anything in front of the unit.**
- **Keep this surface (③) away from walls etc. more than 50 mm to let the unit cool down.**

3.3.5. INSTALLING THE RECORDING PAPER

A4, Letter or legal size recording paper can be used for fax messages. The unit can hold up to 250 sheets of 60/75 g/m2 to (16 lb. to 20 lb.) paper, 230 sheets of 80 g/m2 (21 lb.) or 200 sheets of 90 g/m2 (24 lb.) paper. See the note for paper specifications.

- The unit is set for letter size paper by default. If you want to use legal or A4 size paper, change the setting (feature #16).

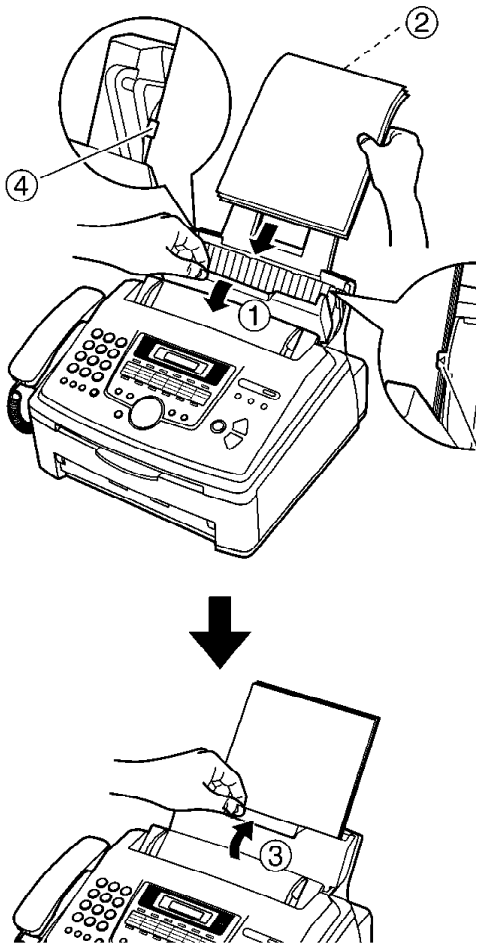
1. **Before inserting a stack of paper, fan the paper to prevent paper jams.**



2. **Pull the tension plate forward (①) and insert the paper, print-side down (②), then push the tension plate (③) back.**

-The paper should not be over the tabs (④)

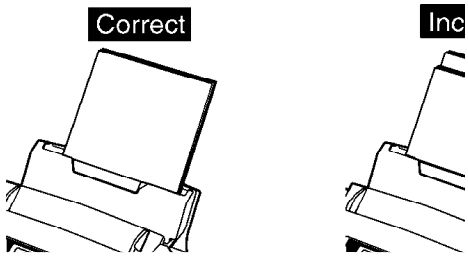
-If the paper is not inserted correctly, readjust the paper, or the paper may be jam.



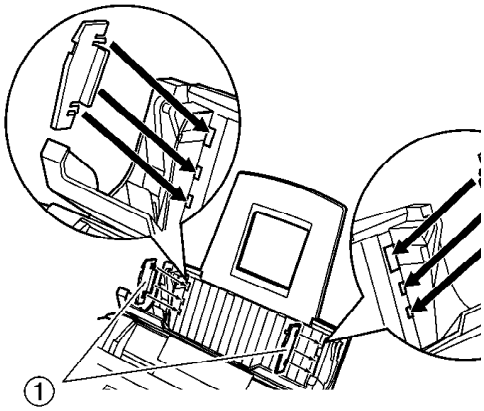
3. **To use A4 size paper**

You need to install the A4 paper guides.

Insert the tabs on the A4 paper guides (①) into the slots.

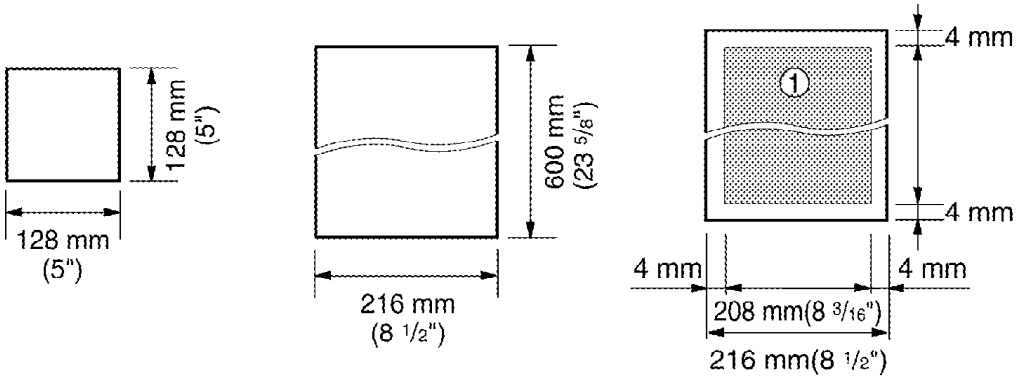


4. -"L" is shown on the A4 paper guide for the left side. "R" is shown on the A4 paper guide for the right side.



3.3.6. DOCUMENTS THE UNIT CAN SEND

3.3.6.1. USING THE ADF (AUTO DOCUMENT FEEDER)



Note:

- Remove chips, staples or other similar fasteners.

- Do not send the following types of documents. (Use copies for fax transmission.)

— Chemically treated paper such as carbon or carbonless duplicating paper

— Electrostatically charged paper

— Badly curled, creased or torn paper

— Paper with a coated surface

— Paper with a faint image

— Paper with printing on the opposite side that can be seen through the other side (i.e. newspaper)

Note for the auto document feeder and the scanner glass

- Check that ink, paste or correction fluid has dried completely.

- To transmit the document with a width of less than A4 size (210 mm), we recommend using a copy machine to copy the original

document onto letter-sized paper, then transmitting the copied document.

3.3.7. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Pressing the dial keys will select a character as shown below.

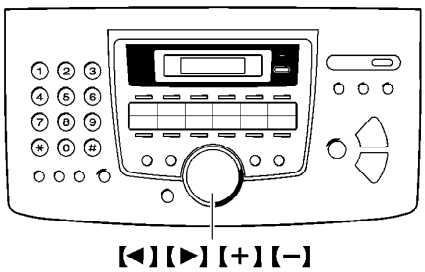
Keys	Characters
1	1 [ ] { } + - / = , . _ ` : ; ? |
2	A B C a b c 2
3	D E F d e f 3
4	G H I g h i 4
5	J K L j k l 5
6	M N O m n o 6
7	P Q R S p q r s 7
8	T U V t u v 8
9	W X Y Z w x y z 9
0	0 ( ) 〈 〉 ! " # $ % & ¥ * @ ^ ' →
#	To change capital or lower case letter.
FLASH	**Hyphen** button (To insert a hyphen.)
HANDSET MUTE	**Insert** button (To insert one character or one space.)
STOP	**Delete** button (To delete a character.)
▶	▶ key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
◀	◀ key (To move the cursor to the left.)

3.3.8. TO SELECT CHARACTERS USING THE (+) OR (-) KE

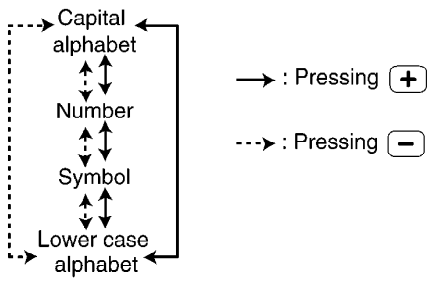
To select characters using + or −

Instead of pressing the dial keys, you can select characters using + or −.

1. Press + or − repeatedly to display the desired character.
2. Press ▶ to move the cursor to the next space.
   - The character displayed in step 1 is inserted.
3. Return to step 1 to enter the next character.



Display order of characters



3.3.9. SETTING YOUR LOGO

The logo can be your company, division or name.

1 Press MENU.

Display:

```
SYSTEM SET UP
PRESS NAVI.[◄ ►]
```

2 Press ◄ or ► repeatedly to display the following.

```
YOUR LOGO
PRESS SET
```

3 Press SET

- Cursor (▒) will disappear on the display.

```
LOGO=▒
```

4 Enter your logo, up to 30 characters, using the dial keypad. See the character table.

Example: "Bill"

1. Press 2 2 times.

Cursor

```
LOGO=B▒
```

2. Press 4 3 times.

```
LOGO=Bi▒
```

3. Press 5 3 times.

```
LOGO=Bil▒
```

4. Press ► to move the cursor to the next space and press 5 3 times.

```
LOGO=Bill▒
```

5 Press SET

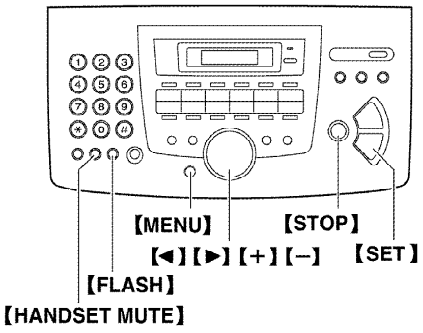
- The next feature will be displayed.

```
YOUR FAX NO.
      PRESS SET
```

6 Press MENU to exit the program.

Note:

- You can enter your logo by pressing + or − (see the next page) in step 4. In this case, press ► to move the cursor.



To change capital or lower case letters

Pressing the # key will change to capital or lower case alternatively.

1. Press 2 2 times.

Display:

```
LOGO=B
```

2. Press 4 3 times.

```
LOGO=BI
```

3. Press #.

```
LOGO=Bi
```

4. Press 5 3 times.

```
LOGO=Bil
```

To correct a mistake

- Press ◄ or ► to move the cursor to the incorrect character, and make the correction.

To delete a character

- Press ◄ or ► to move the cursor to the character you want to delete and press STOP (Delete).

To insert a character

1. Press ◄ or ► to move the cursor to the position to the right of where you want to insert the character.
2. Press HANDSET MUTE (Insert) to insert a space and enter the character.

3.3.10. REPLACING THE TONER CARTRIDGE AND THE DRUM UNIT

When the display shows the following, replace the toner cartridge.

Display: `TONER LOW` or `TONER EMPTY`

We recommend you replace the drum unit every fourth time you replace the toner cartridge. To check the drum life and quality, please print the printer test list.

To ensure that the unit operates properly, we recommend the use of Panasonic toner cartridge (Model No. KX-FA83) and drum unit (Model No. KX-FA84).

Caution:

- We cannot be responsible for any damage to the unit or

degradation of print quality which may occur from the use of non-Panasonic toner cartridge and drum unit.

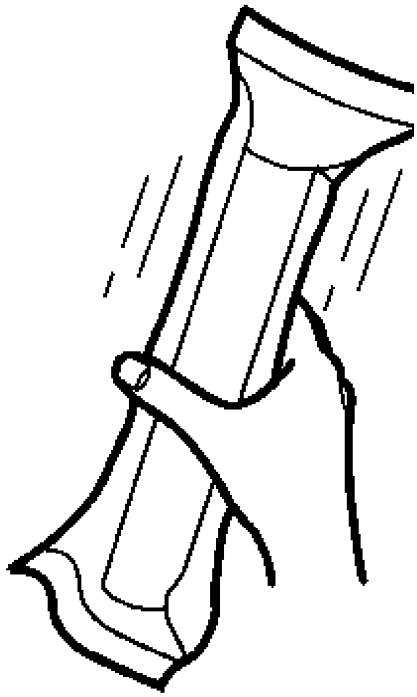
- The drum unit contains a photosensitive drum. Exposing it to light may damage the drum. Once you have opened the protection bag:
—Do not expose the drum unit to light for more than 5 minutes.
—Do not touch or scratch the green drum surface.
—Do not place the drum unit near dust or dirt, or in a high humidity area.
—Do not expose the drum unit to direct sunlight.

- Do not unplug the fax machine to prevent loss of fax documents in memory.

- Do not leave the toner cartridge out of the protection bag for a long time. It will decrease the toner life.

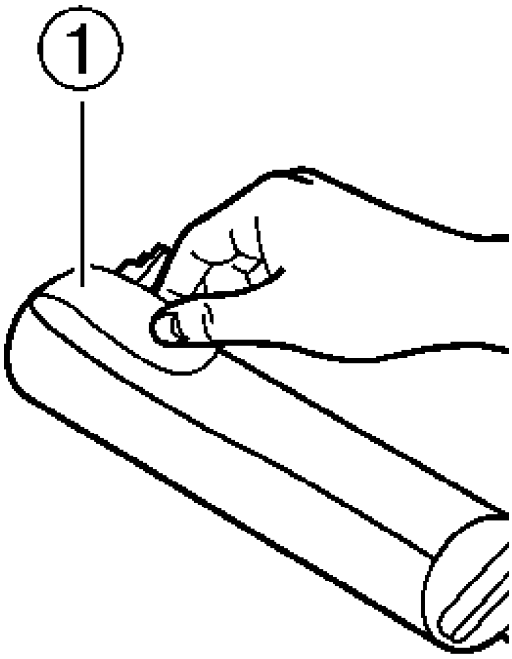
- Do not pour any toner into the toner cartridge.

1. Before opening the protection bag of the new toner cartridge, shake it vertically more than 5 times.

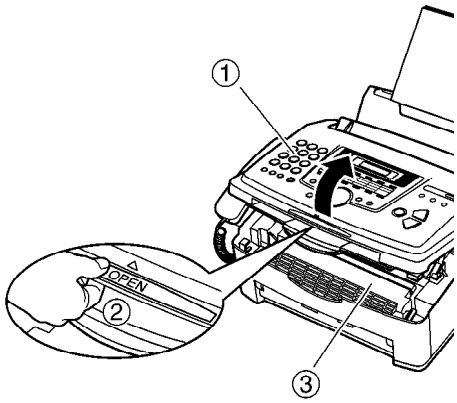


2. **Remove the new toner cartridge from the protection bag.**

Peel off the seal (①) from the toner cartridge.



3. **Lift open the front cover (①), holding OPEN (②).**



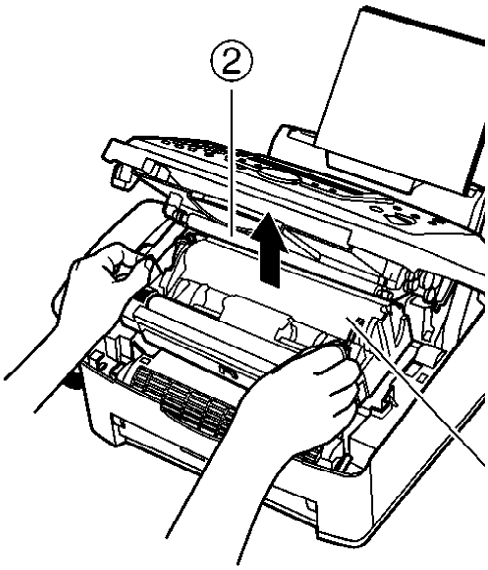
Caution:
The fuser unit (③) gets hc
Do not touch it.

4. **Tap on the used toner cartridge several times to allow the remaining toner to fall into the drum unit.**

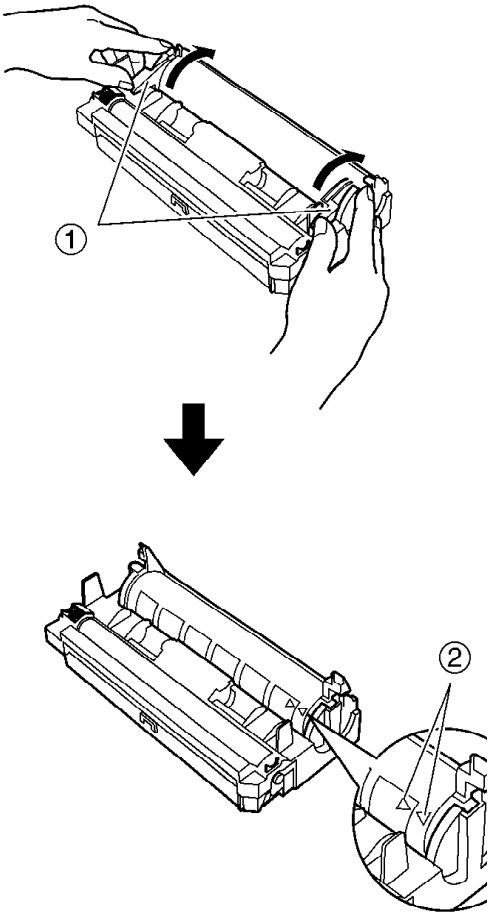
   Remove the drum and toner unit (①) by holding the two tabs.

   -Do not touch the transfer roller (②).

   -If you replace the toner cartridge and the drum unit at the same time, skip to step 7.



5. **Turn the two levers (①) on the used toner cartridge firmly, until the triangles (②) match.**

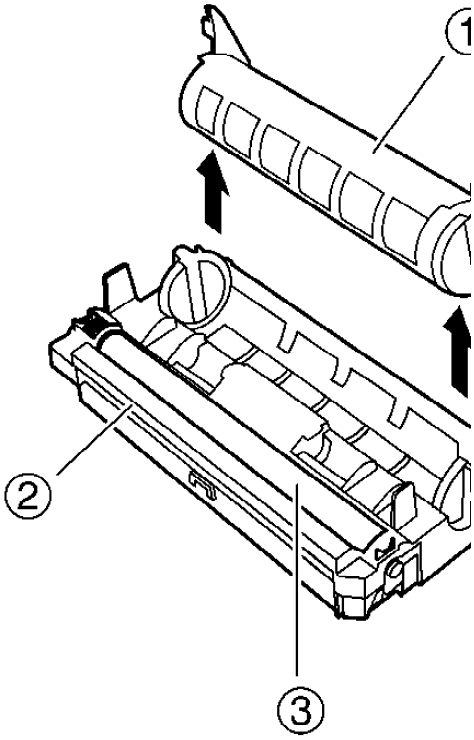


6. Remove the used cartridge (①) from the drum unit (②).

-The toner may stick to the cartridge and the drum unit. Be careful when handling.

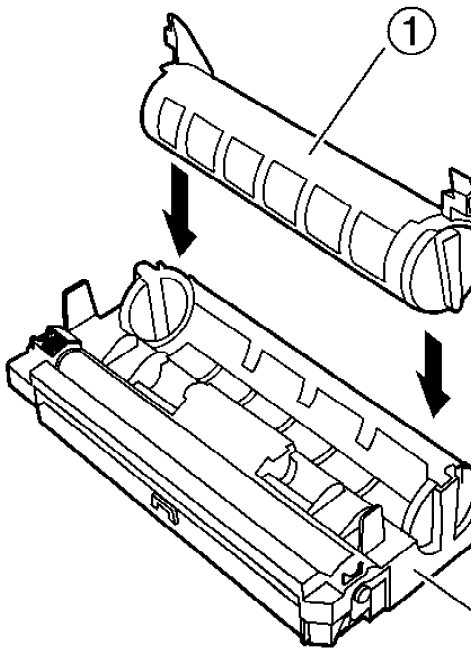
-Do not drop the toner on the green drum surface (③).

-Put the used toner cartridge into the protection bag.

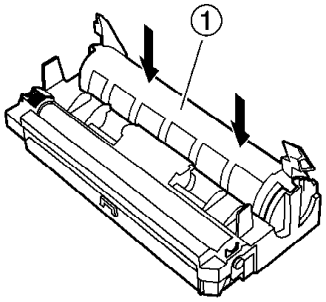


7. If you replace the drum unit at the same time, remove the new drum unit from the protection bag.

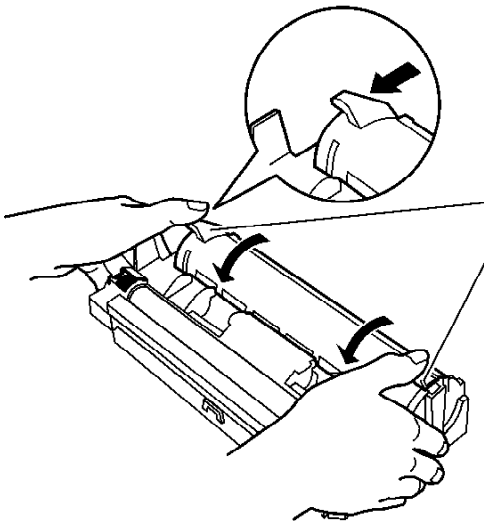
Place the toner cartridge (①) into the drum unit (②) vertically.



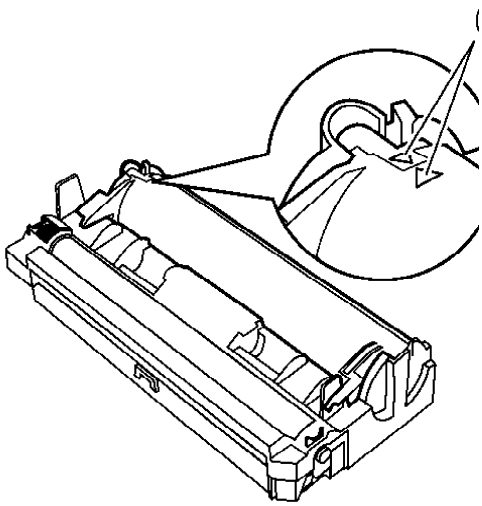
8. **Firmly press down the toner cartridge to snap into position.**



9. **Turn the two levers (1) on the toner cartridge firmly.**

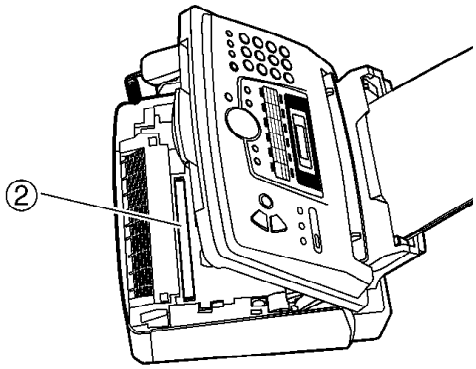


10. **Make sure that the triangles (1) match, to install the toner cartridge correctly.**



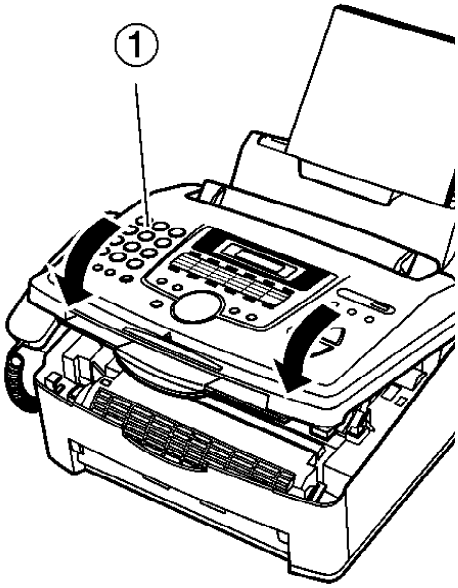
11. **Install the drum and toner unit (①) by holding the tabs.**

-If the lower glass (②) is dirty, clean it with a soft dry cloth.



12. **Close the front cover (①) by pushing down on both sides, until locked.**

-While the unit displays "PLEASE WAIT", do not open the front cover, or disconnect the power cord.



4. MAINTENANCE

4.1. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

4.1.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance
Inspect the equipment periodically and if necessary, clean any contaminated parts.

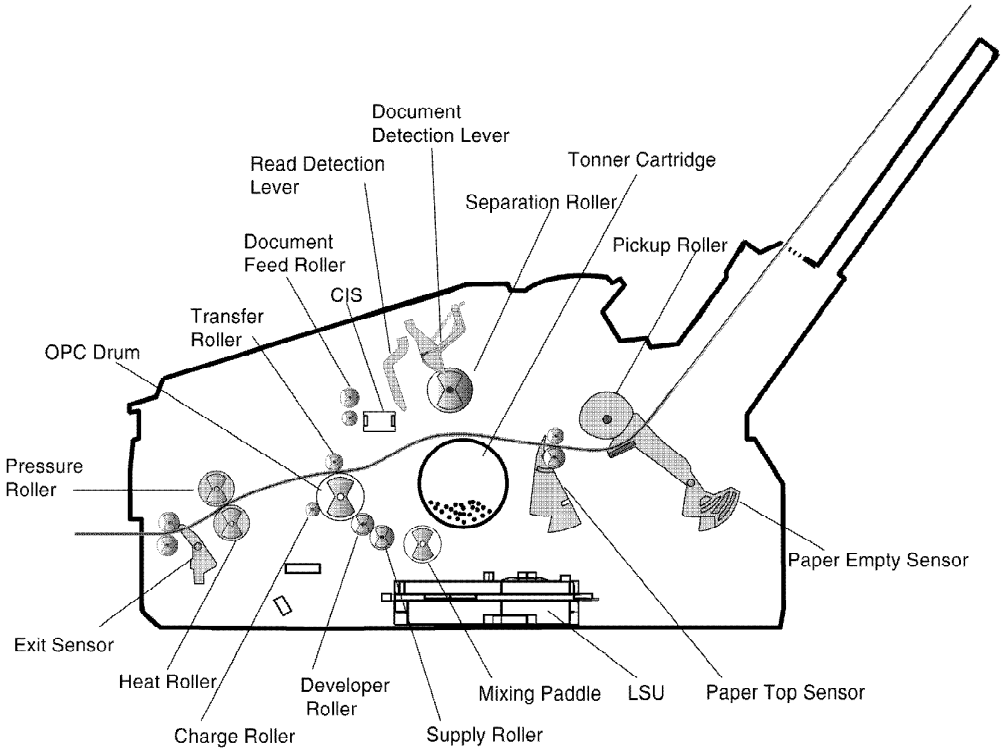
2. Check for breakdowns
Look for problems and consider how they arose.
If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment
Perform copying, self testing and communication testing to

determine if the problem originates from the transmitter, receiver or the telephone line.

4. **Determine causes**
   Determine the causes of the equipment problem by troubleshooting.
5. **Equipment repairs**
   Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.
6. **Confirm normal operation of the equipment**
   After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.
7. **Record keeping**
   Make a record of the measures taken to rectify the problem for future reference.

4.1.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



4.1.2.1. Maintenance List

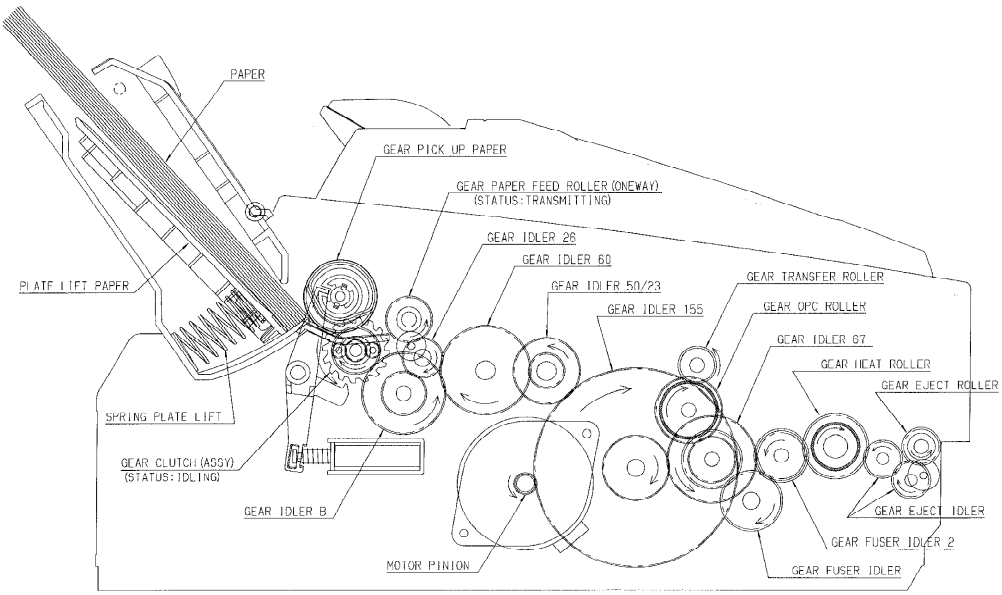
NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to MAINTENANC CHECK ITEMS/COMP LOCATIONS( ).()
3	Sensors	Document sensor (PS500), Paper feed sensor (PS501), Printer cover open switch (SW101),ADF cover open sensor (SW501), FB cover open sensor (SW500), ADF CIS position sensor (PS502),FB CIS position sensor (PS503)Resist sensor (PC201) ,Paper exit sensor (PS50). Paper sensor (PS1)Confirm the operation of the sensors.	See MAINTENANCE C ITEMS/COMPONENT LOCATIONS() and SE AND SWITCHES SEC TEST FUNCTIONS()
4	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to MAINTENANC
5	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

4.1.2.2. Maintenance Cycle

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Proced
1	ADF Separation Roller (Ref.No.50)	3 months	7 years* (100,000 documents)	Refer to HOW T REMOVE THE SEPARATION I ().
2	Paper Feed Roller (Ref.No.154)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE SEPARATION I ().
3	ADF Separation Rubber (Ref. No.35)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE SEPARATION I ().
4	ADF Exit Roller (Ref.No.34)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE SEPARATION I ().
5	Pick up Roller (Ref No.108)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE UNIT ().
6	Separation Rubber (Ref. No.99)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE ROLLER ().
7	Document Feed Roller (Ref.No.154)	3 months	7 years (100,000 documents)	Refer to HOW TO REMO SEPARATION I

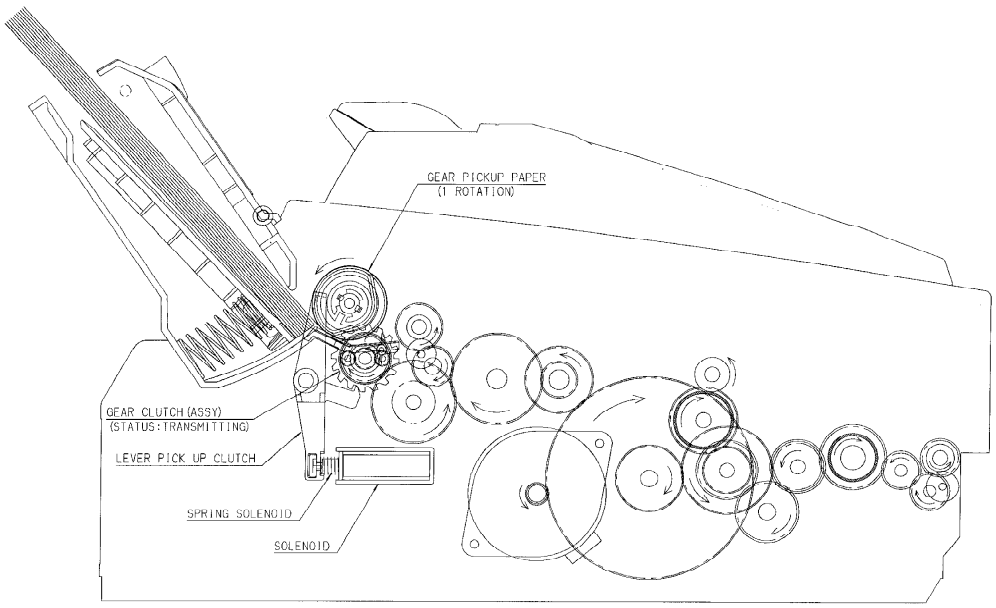
No.	Item	Cleaning Cycle	Replacement	
			Cycle	Proced
8	Transfer Roller (Ref.No.73)	3 months	7 years (100,000 documents)	Refer to HOW T REMOVE THE TRANSFER RC
9	Pressure Roller (Ref.No.120)	3 months	7 years (100,000 documents)	Refer to FUSEI SECTION ().
10	Heat Roller (Ref.No.127)	3 months	7 years (100,000 documents)	Refer to FUSEI SECTION ().
11	Exit Roller (Ref.No.142)	3 months	7 years (100,000 documents)	Refer to FUSEI SECTION ().

4.2. PRINTING



- The motor pinion rotates in the direction shown in the figure.
- The gears of fixing and developing parts are driven by the GEAR IDLER 67.
- The GEAR PAPER FEED ROLLER drives the roller.
- The GEAR CLUTCH runs idle and GEAR PICKUP PAPER is still.

4.3. PRINTING (PAPER PICK UP)



During printing

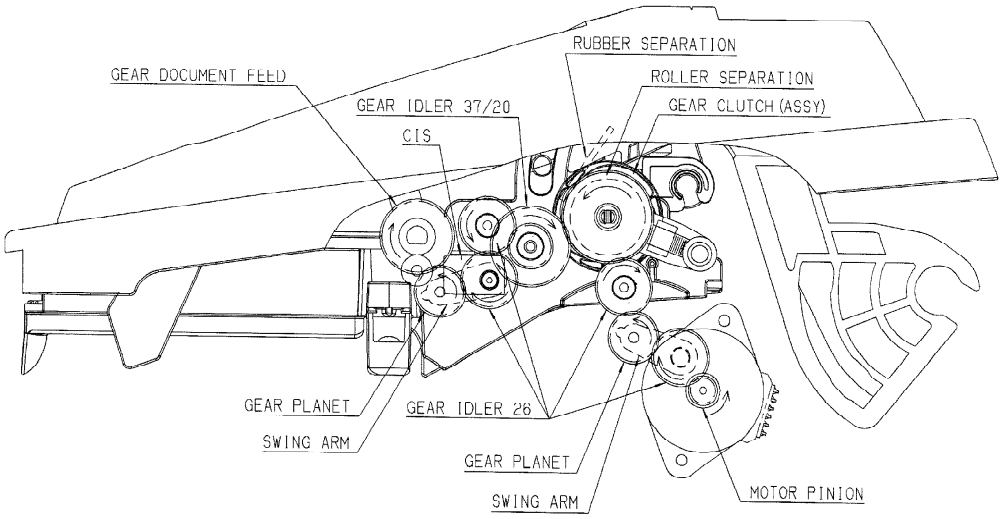
- When the SOLENOID is turned ON, the LEVER PICK UP CLUTCH is hooked on the RING of GEAR CLUTCH. It causes the GEAR PICKUP PAPER to rotate.

- The recording paper is pressed by the PICKUP ROLLER and the top paper is separated and fed.

- Even the SOLENOID is turned OFF, it can not stop on the way of a turn because the tip of LEVER PICK UP CLUTCH is on the CAM of GEAR PICKUP PAPER.

- When the tip of LEVER PICK UP CLUTCH returns to CAM's home position, the GEAR CLUTCH RING is unhooked, then the GEAR PICKUP PAPER is stopped.

4.4. SCANNING (ADF)



- DOCUMENT TRANSMISSION (ADF)

When the tip of the document is set to a point of contact between the separation roller and the separation pad through the document feed roller, then the document is fed there separately. The document feed roller carries the document and the CIS reads it through the glass. The document is exited through the document feed roller.

4.5. MAINTENANCE

If a black line, a white line or a dirty pattern appears on your recording paper, on your original, or on the fax document received by the other party, clean the white plate, scanner glass and lower glass.

4.5.1. CLEANING THE INSIDE OF THE UNIT

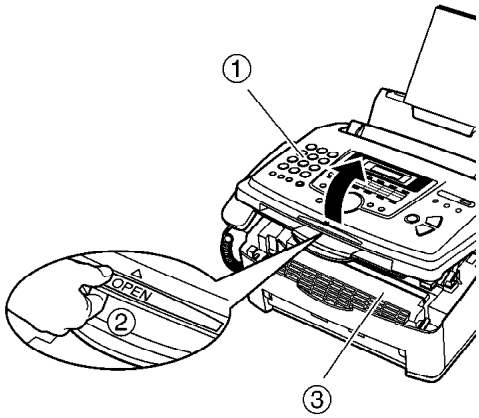
If any of the following problems occurs, clean the inside of the unit:
— If misfeeding of your original occurs frequently.
— If a black line, a white or dirty pattern appears on your recording paper, on your original, or on the fax document received by the other party.
Caution:

- Be careful when handling the toner and drum unit.

- Do not use paper products, such as paper towels or tissues, to clean inside of the unit.

1. **Disconnect the power cord and the telephone line cord.**

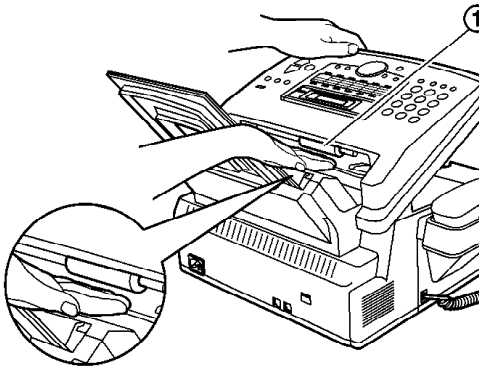
2. **Lift open the front cover (①) , holding OPEN (②).**





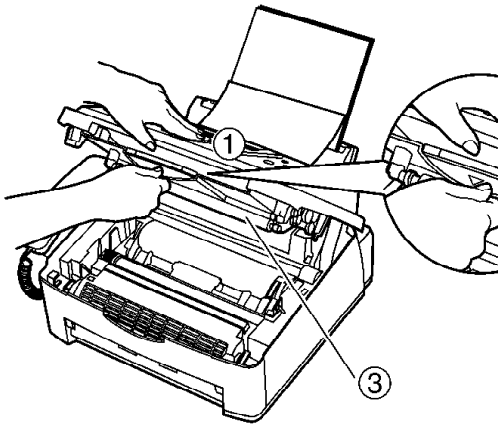
Caution:
The fuser unit (③) gets
Do not touch it.

3. **Clean the document separation roller (①) with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.**



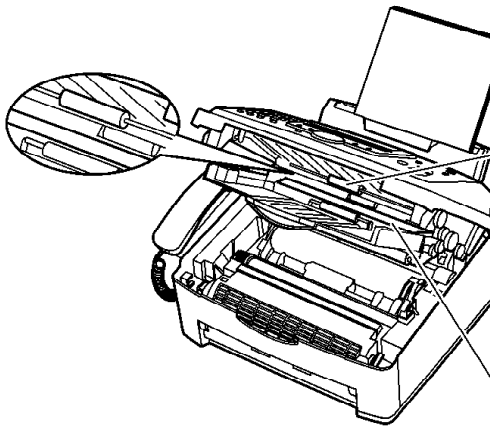
4. **Hold the center part of the front cover (①), and pull open the inner cover (②).**

   -Do not touch the transfer roller (③).



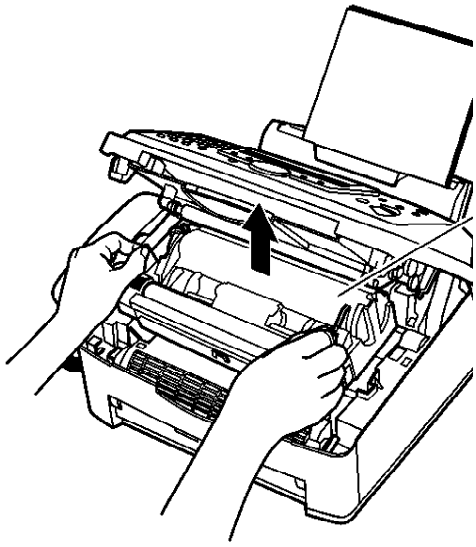
5. **Clean the document feeder roller (①) with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.**

   Clean the upper glass (②) with a soft and dry cloth.

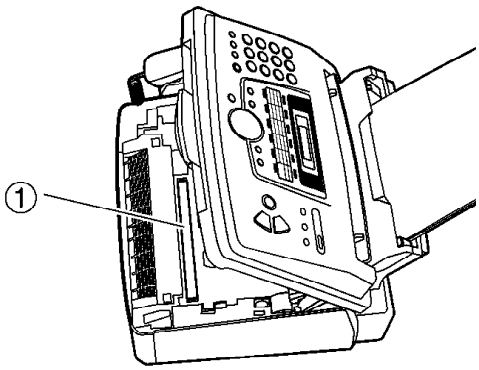


6. **Push back the inner cover.**

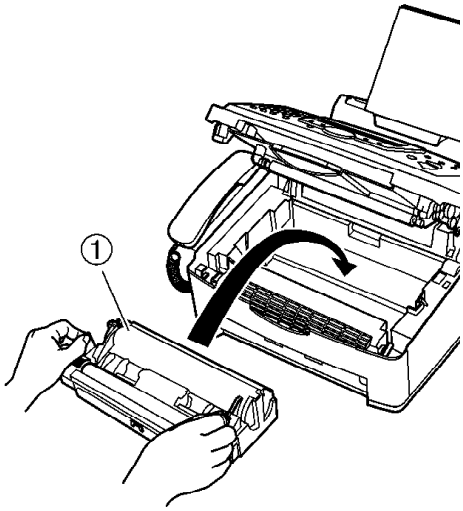
7. **Remove the drum and toner unit (①) by holding the two tabs.**



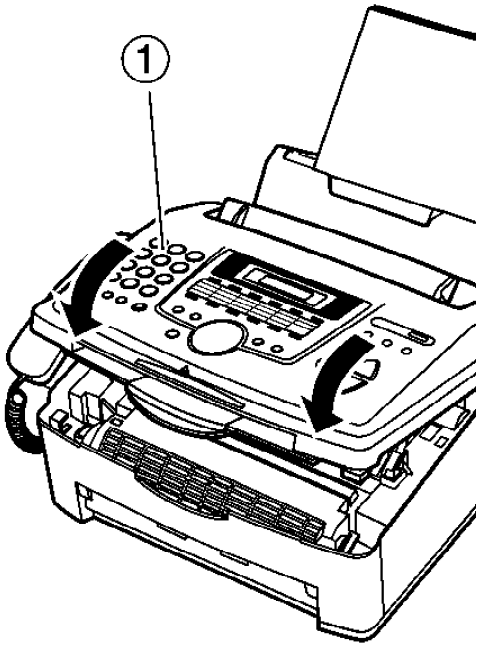
8. **Clean the lower glass (①) with a soft and dry cloth.**



9. **Reinstall the drum and toner unit (①) by holding the tabs.**



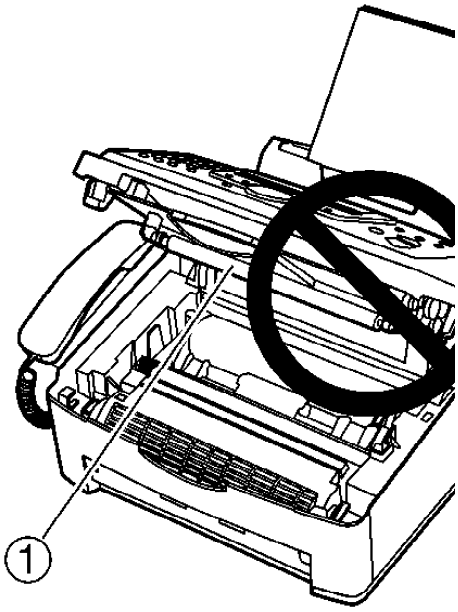
10. **Close the front cover (①) by pushing down on both sides, until locked.**



11. **Reconnect the power cord and the telephone line cord.**

Note:

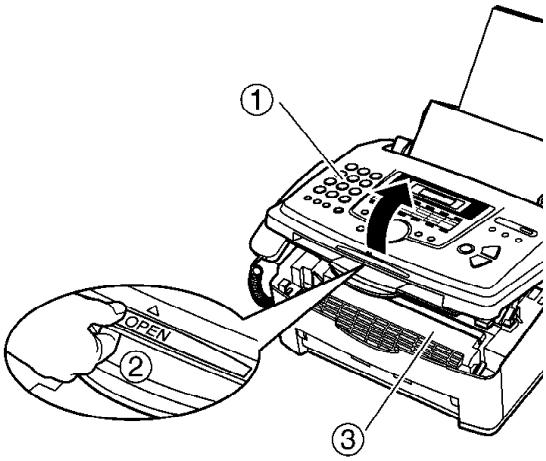
- Do not touch the transfer roller (①).



4.6. DOCUMENT JAMS

If the unit does not release the document during feeding, remove the jammed document as follows.

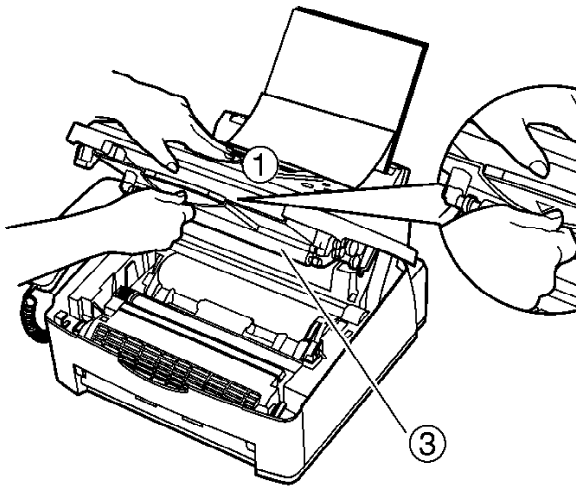
1. **Lift open the front cover (①), holding OPEN (②).**



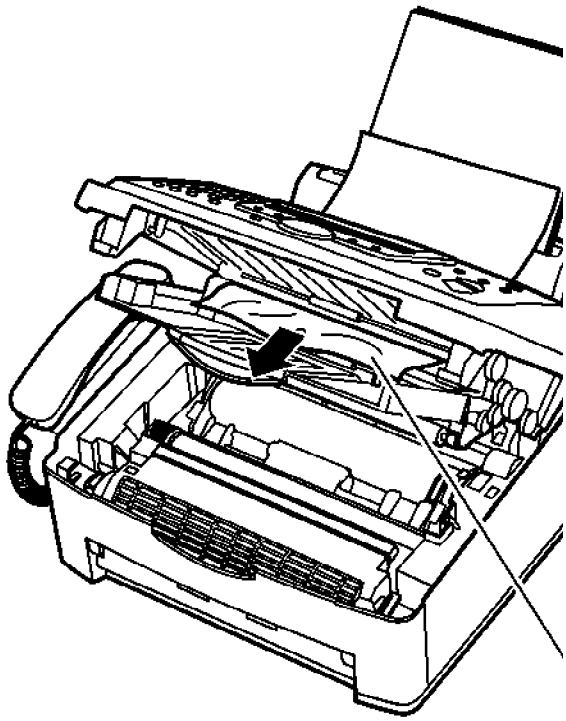
Caution:
The fuser unit (③) gets h
Do not touch it.

2. **Hold the center part of the front cover (①), and pull open the inner cover (②).**

   -Do not touch the transfer roller (③).

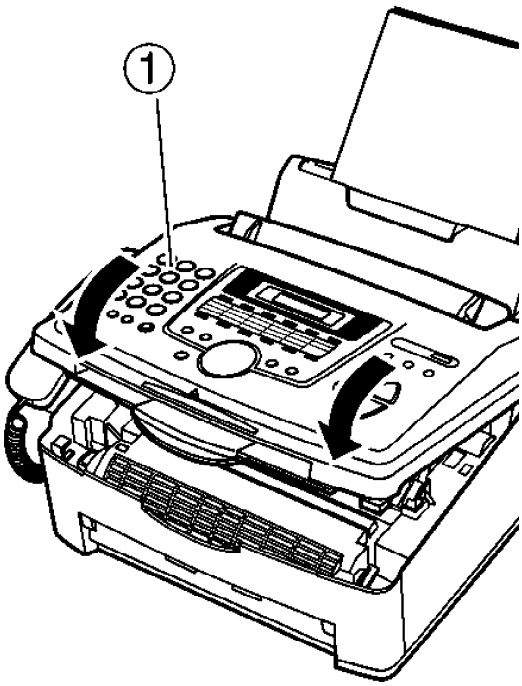


3. **Remove the jammed document carefully (①).**



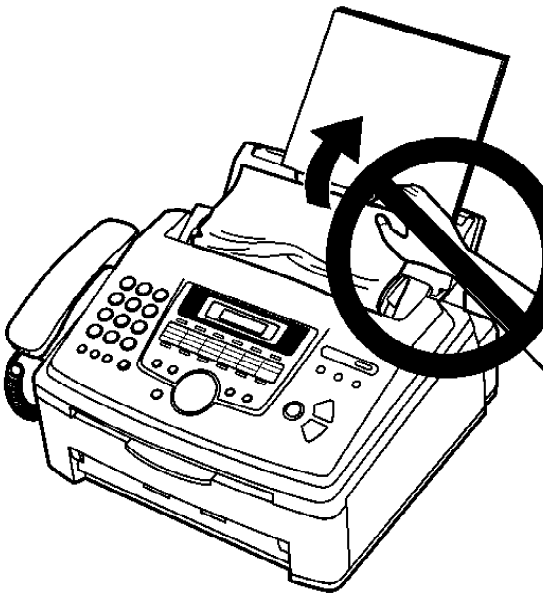
4. **Push back the inner cover.**

5. **Close the front cover (①) by pushing down on both sides, until locked.**



Note:

-Do not pull out the jammed document forcibly before opening the front cover.



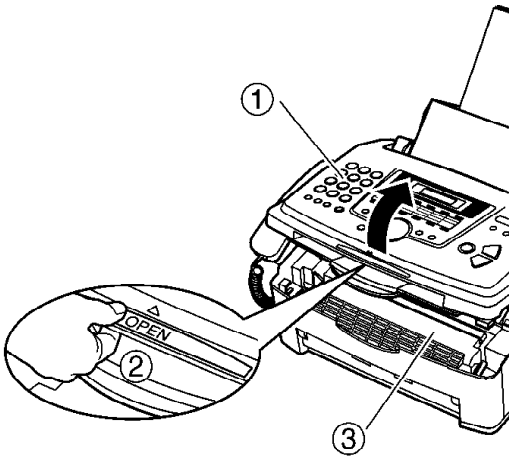
4.7. RECORDING PAPER JAMS

4.7.1. When the recording paper has jammed in the unit

If the unit does not eject any recording paper during reception or copying, the recording paper has jammed and the display will show the following massage.
The display will show the following.

Display: PAPER JAMMED

1. **Lift open the front cover (①), holding OPEN (②).**

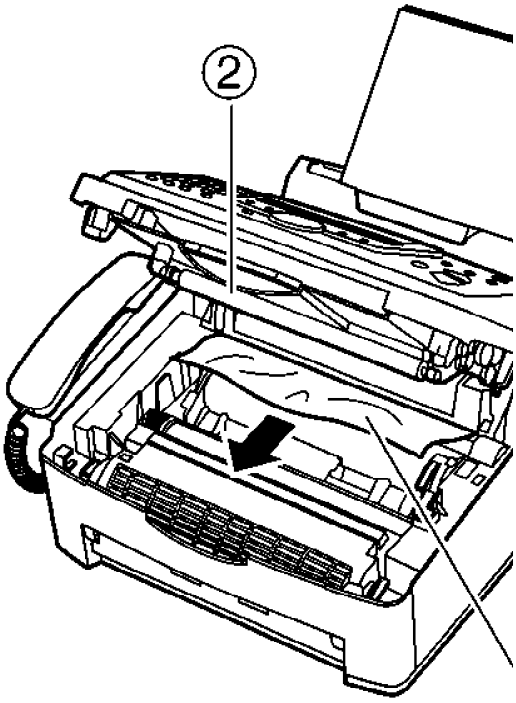


Caution:
The fuser unit (③) gets
Do not touch it.

2. **Remove the jammed paper.**
When the recording paper has jammed near the drum and toner unit:

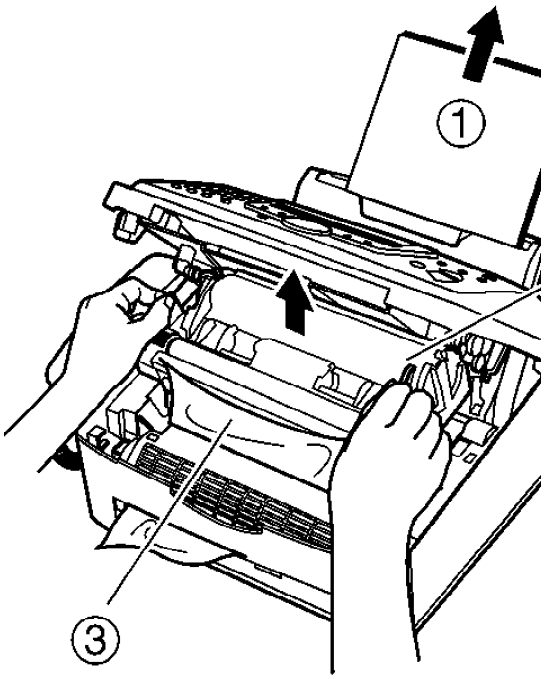
Remove the jammed paper (①) carefully by pulling it toward you.

-Do not touch the transfer roller (②).

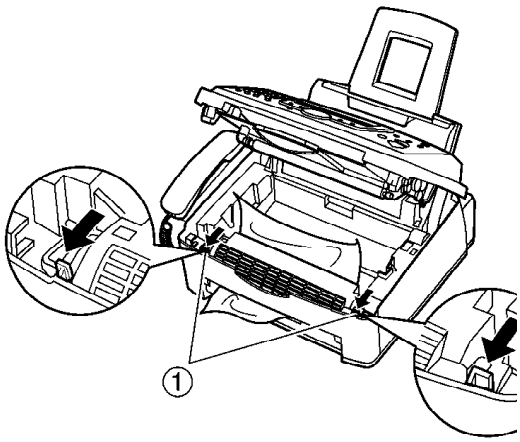


When the recording paper has jammed near the recording paper exit:

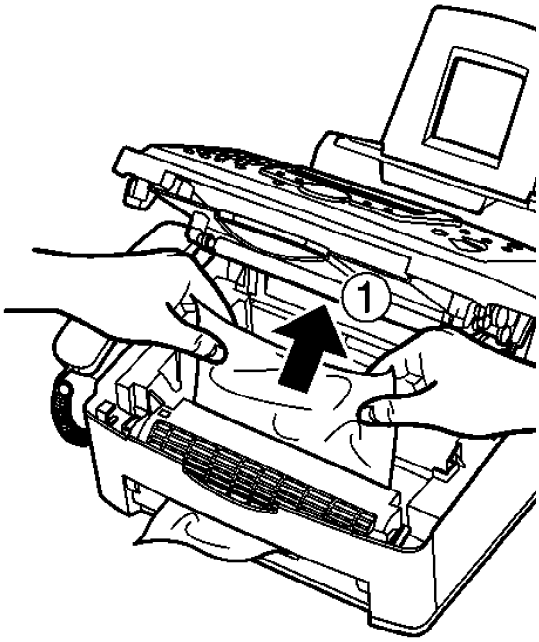
1. Remove the recording paper (①), then remove the drum and toner unit (②) to allow the jammed paper (③) to pull free from the rear cabinet.



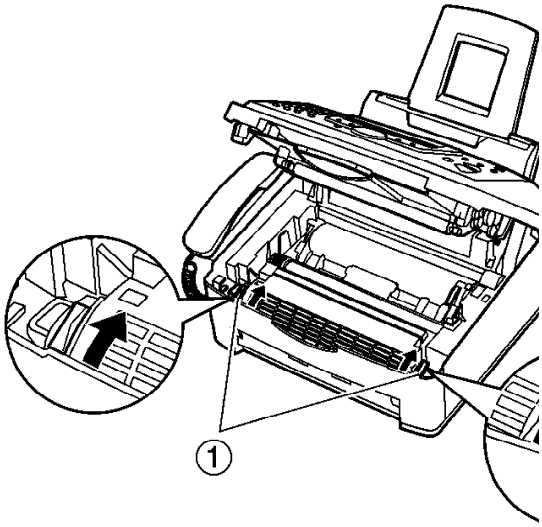
2. Lift both green levers (①) forward until they stop.



3. Remove the jammed paper (①) from the fuser unit by pulling it upwards carefully, then install the drum and toner unit.

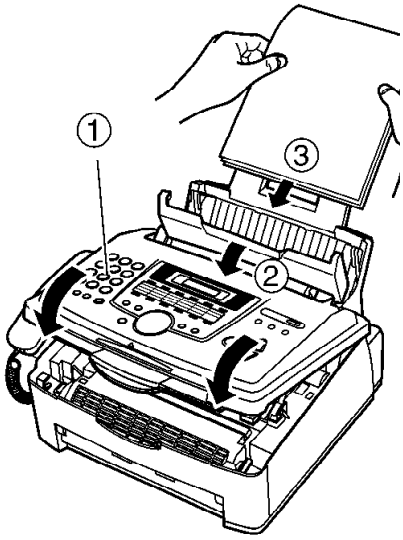


4. Push back the levers (①) to the original position.



3 **Close the front cover (①) by pushing down on both sides, until locked. Pull the tension plate forward (②) and re-insert the recording paper (③), then push back the tension plate.**

-Before re-inserting, make sure to fan and straighten the recording paper.



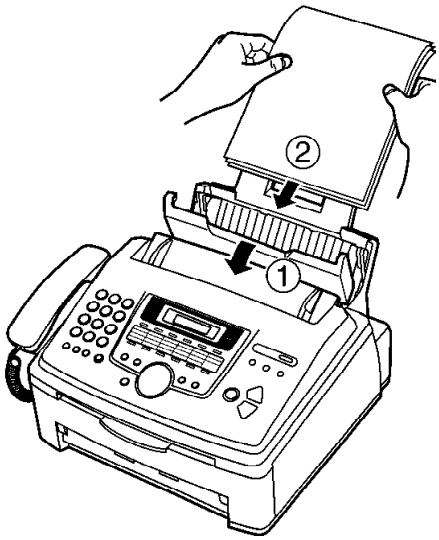
4.7.2. When the recording paper is not fed into the unit properly

The display will show the following.

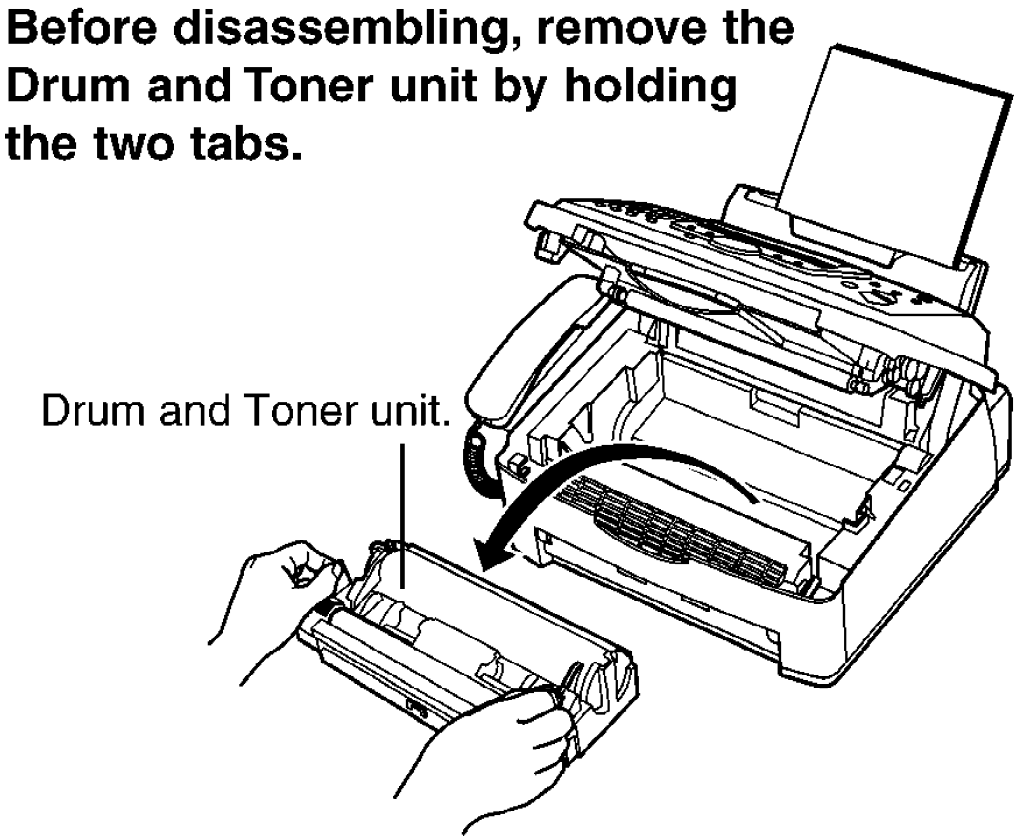
Display: FAILED PICK UP

1. **Remove the recording paper. Pull the tension plate forward (①) and re-insert the recording paper (②), then push back the tension plate.**

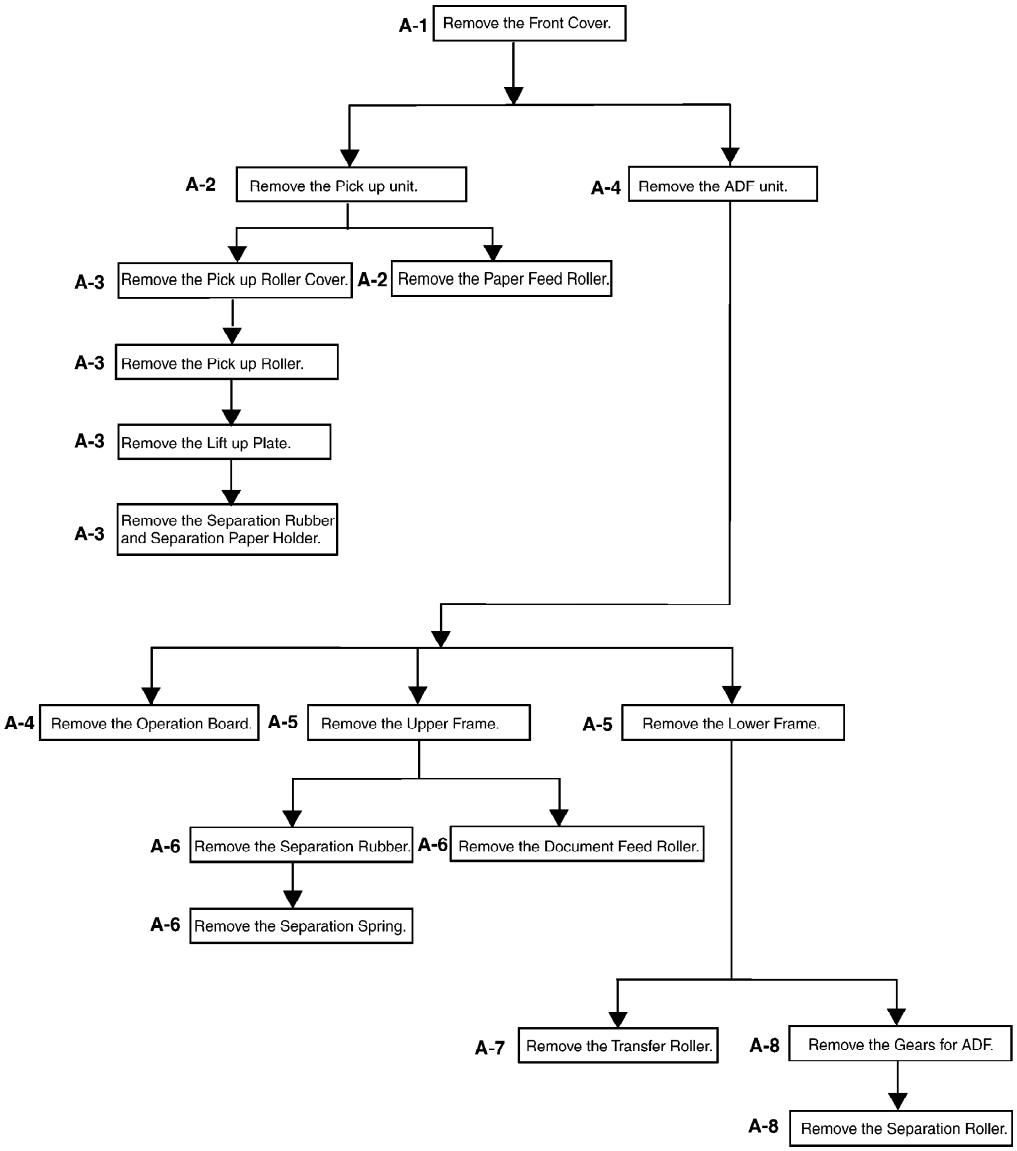
-Before re-inserting, make sure to fan and straighten the recording paper.



5. DISASSEMBLY INSTRUCTIONS



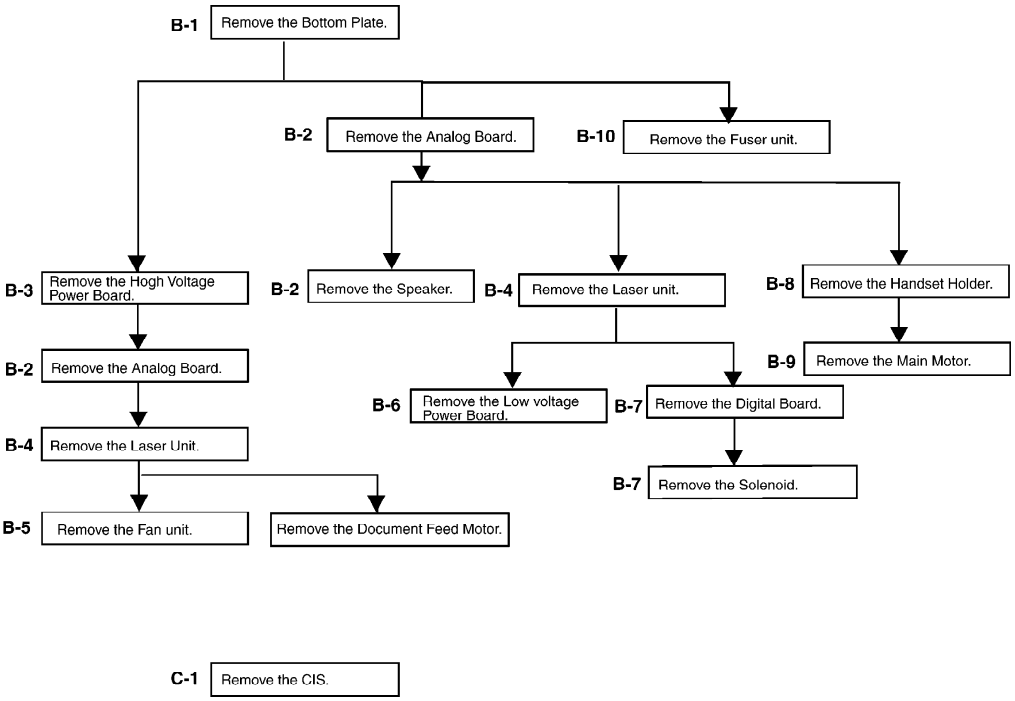
5.1. UPPER MAIN CABINET SECTION



CROSS REFERENCE:

A1: HOW TO REMOVE THE OPERATION PANEL ASS'Y ()
A2: HOW TO REMOVE THE PICK UP UNIT ()
A3: HOW TO REMOVE THE PICK UP ROLLER ()
A4: HOW TO REMOVE THE OPERATION BOARD ()
A5: HOW TO REMOVE THE LOWER FLAME ()
A6: HOW TO REMOVE THE SEPARATION RUBBER ()
A7: HOW TO REMOVE THE TRANSFER ROLLER ()
A9: HOW TO REMOVE THE FAN UNIT ()
A10: HOW TO REMOVE THE LOW VOLTAGE POWER BOARD ()

5.2. LOWER MAIN CABINET SECTION



CROSS REFERENCE:

A1: HOW TO REMOVE THE OPERATION PANEL ASS'Y ()
A5: HOW TO REMOVE THE LOWER FLAME ()
A6: HOW TO REMOVE THE SEPARATION RUBBER ()
A7: HOW TO REMOVE THE TRANSFER ROLLER ()
B1: HOW TO REMOVE THE BOTTOM PLATE ()
B2: HOW TO REMOVE THE ANALOG BOARD ()
B3: HOW TO REMOVE THE HIGH VOLTAGE POWER BOARD ()
B4: HOW TO REMOVE THE LASER UNIT ()
B5: HOW TO REMOVE THE SOLENOID ()

5.3. HOW TO REMOVE THE OPERATION PANEL ASS'Y

PROCEDURE: A-1

REF.NO.A-1

(1) Open the Front Cover.
(2) Insert the small screwdriver as illustrated in Fig-1
(3) Close the Front Cover with the screwdriver remaining like Fig-2 and raise it with the screwdriver.
(4) Lift up the Front Cover.(Fig-3)
*When disassembling the Front Cover , turn the unit on its side, as shown in Fig-4.

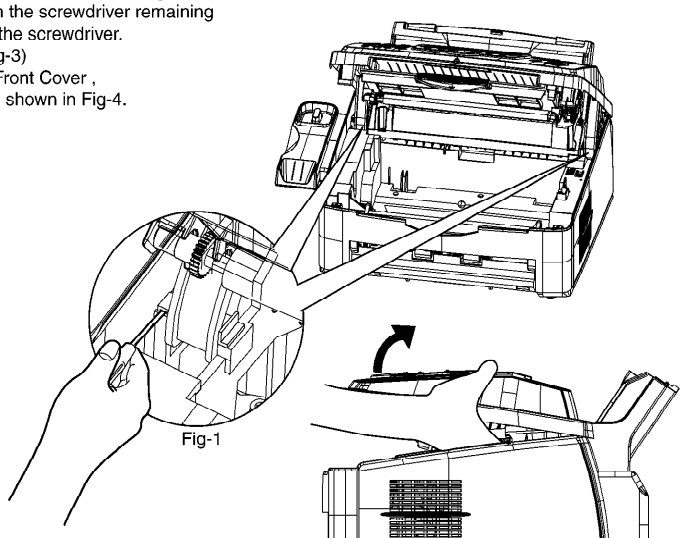


Fig-1

Fig-2

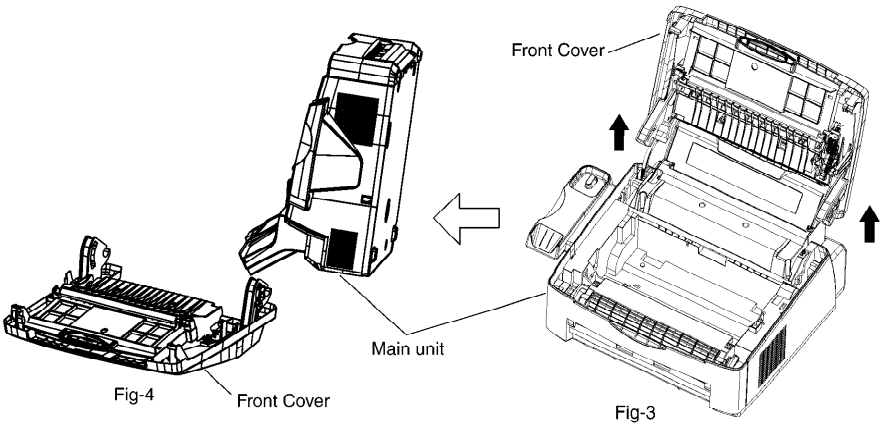


Fig-4

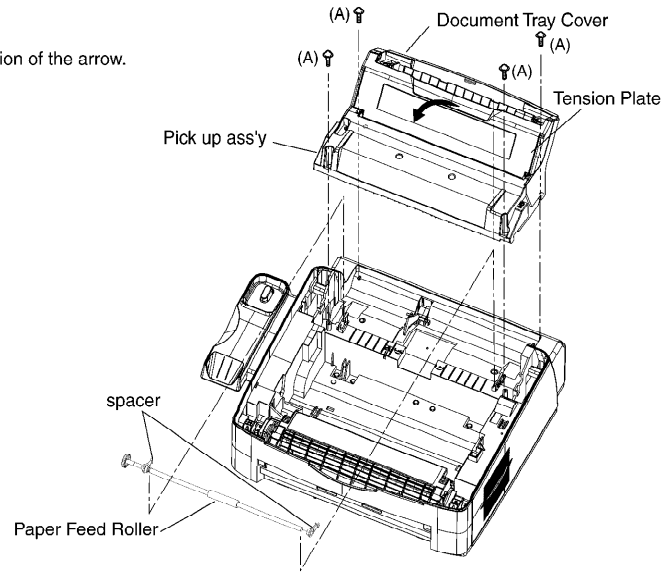
Fig-3

5.4. HOW TO REMOVE THE PICK UP UNIT

PROCEDURE: A1--> A-2

REF.NO.A-2

1) Pull the tension plate in the derection of the arrow.
2) Remove the 4 screws (A).
3) Lift up the Pick up ass'y.
4) Remove the 2 spacers.
5) Remove the Paper Feed Roller.

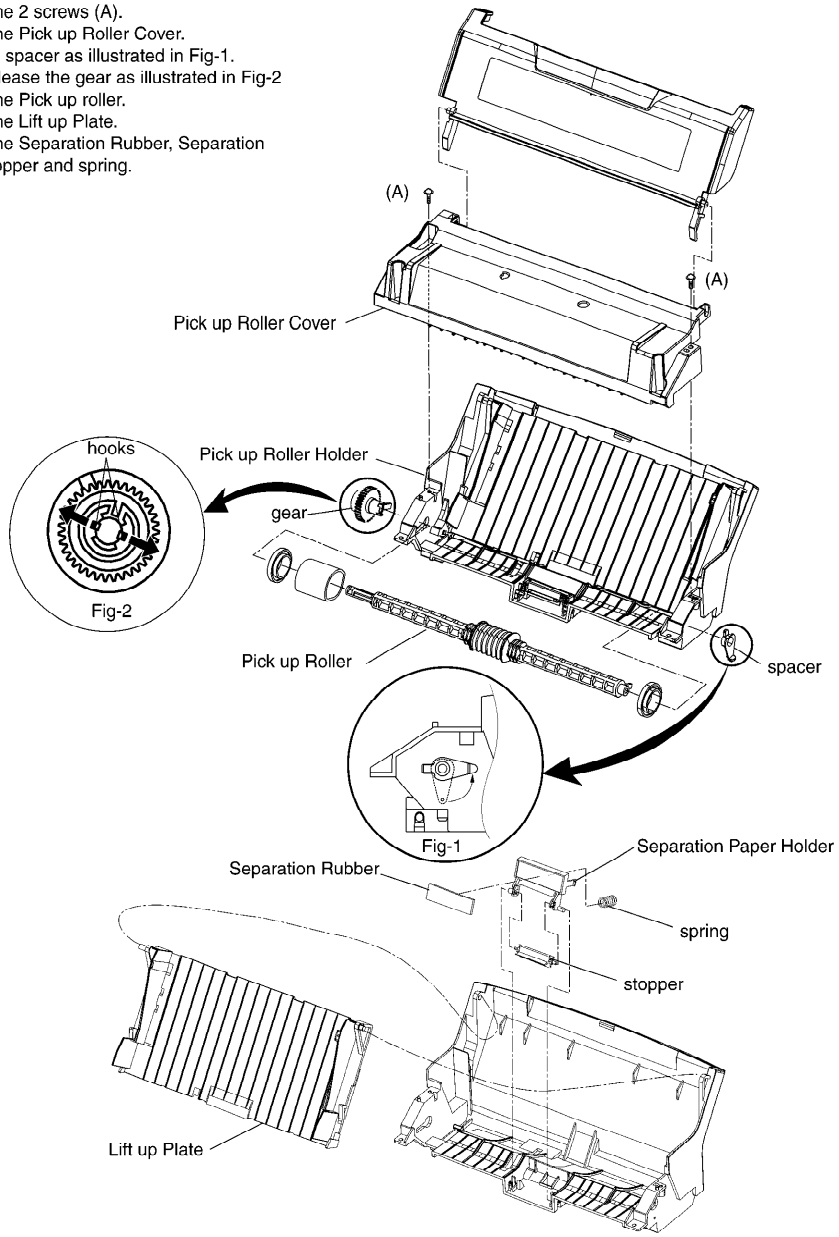


5.5. HOW TO REMOVE THE PICK UP ROLLER

PROCEDURE: A-1-->A-2-->A-3

REF.NO.A-3

1) Remove the 2 screws (A).
2) Remove the Pick up Roller Cover.
4) Rotate the spacer as illustrated in Fig-1.
   and the release the gear as illustrated in Fig-2
5) Remove the Pick up roller.
6) Remove the Lift up Plate.
7) Remove the Separation Rubber, Separation Holder, stopper and spring.

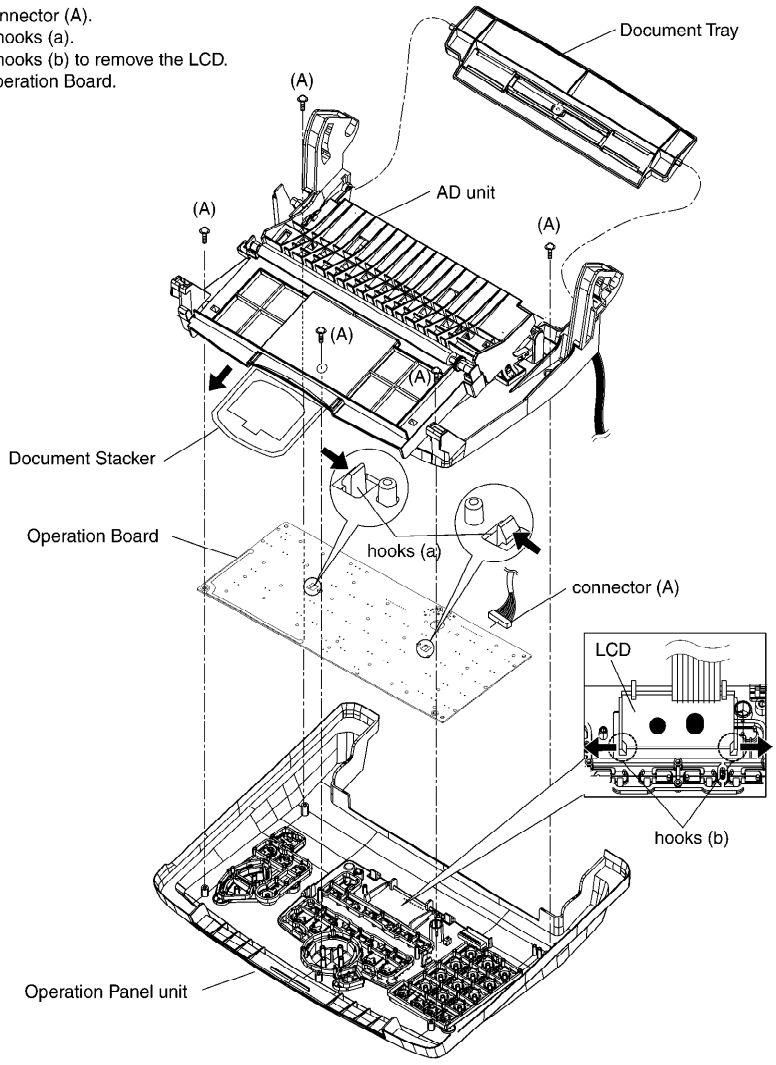


5.6. HOW TO REMOVE THE OPERATION BOARD

PROCEDURE: A-1--> A-4

REF.NO.A-4

1) Pull out the Document Stacker ahead.
2) Remove the 5 screws (A)
3) Separate the AD (Auto Document Feeder) unit from the Operation Panel unit.
4) Remove the connector (A).
5) Release the 2 hooks (a).
6) Release the 2 hooks (b) to remove the LCD.
7) Remove the Operation Board.

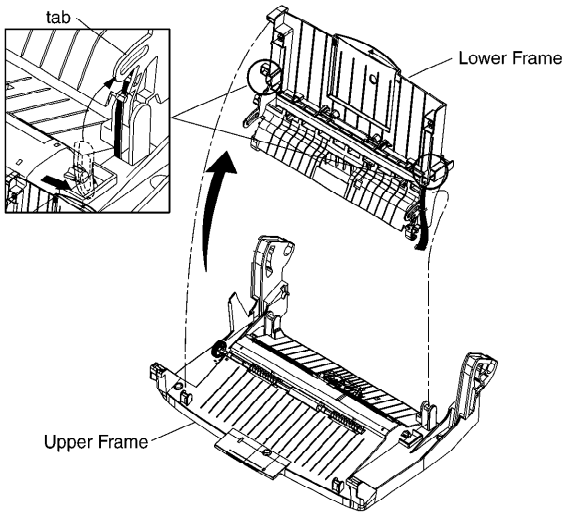


5.7. HOW TO REMOVE THE LOWER FLAME

PROCEDURE: A1--> A-4--> A-5

REF.NO.A-5

1) Push the two tabs toward the outside of the unit and lift the Lower Frame.

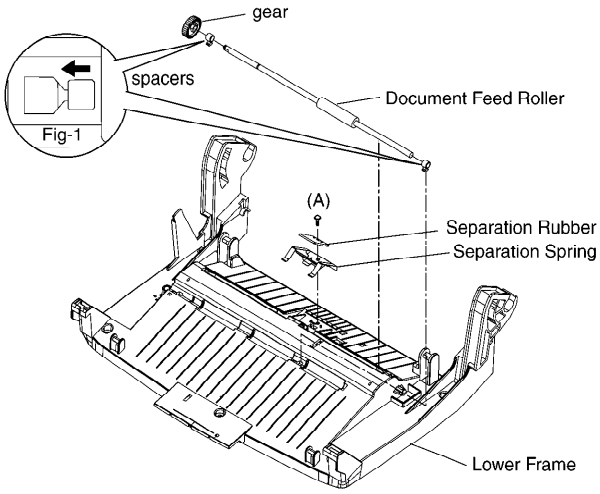


5.8. HOW TO REMOVE THE SEPARATION RUBBER

PROCEDURE: A-1--> A-4--> A-5--> A-6

REF.NO.A-6

1) Remove the screw (A).
2) Remove the Separation Rubber and Separation Spring.
3) Remove the 2 spacers as illustrated Fig-1.
4) Remove the gear.
5) Remove the Document Feed Roller.



5.9. HOW TO REMOVE THE TRANSFER ROLLER

PROCEDURE: A-1--> A-4--> A-5--> A-7

REF.NO.A-7

1) Remove the 2 spacers as illustrated Fig-1.
(If the leg of both the sides of the spacer is pinched using tweezers, it can remove easily.)
2) Remove the Transfer Roller.

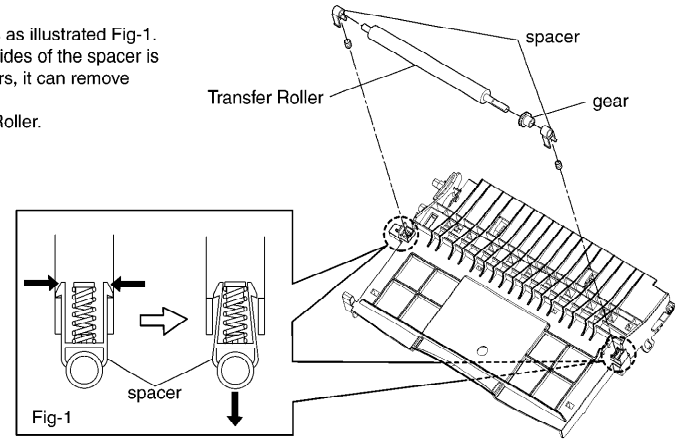


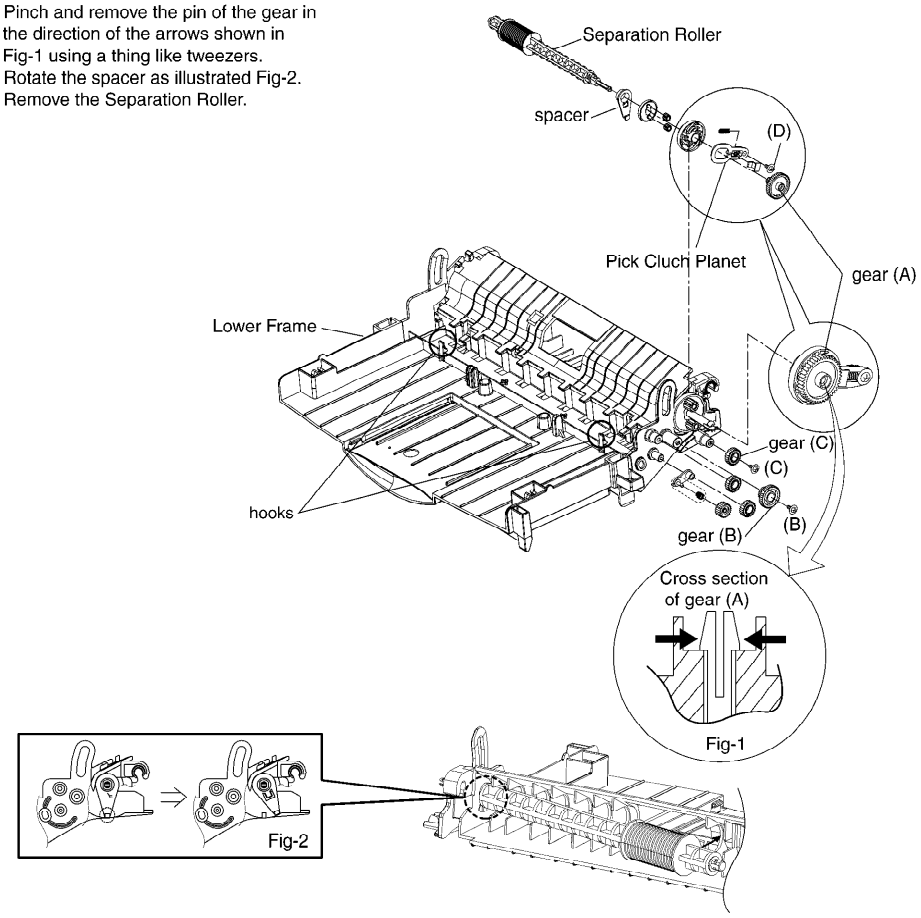
Fig-1

5.10. HOW TO REMOVE THE SEPARATION ROLLER

PROCEDURE: A-1--> A-4--> A-5--> A-8

REF.NO.A-8

1) Remove the screw (B) and (C).
2) Remove the gear (B) and (C).
3) Pinch and remove the pin of the gear in the direction of the arrows shown in Fig-1 using a thing like tweezers.
4) Rotate the spacer as illustrated Fig-2.
5) Remove the Separation Roller.

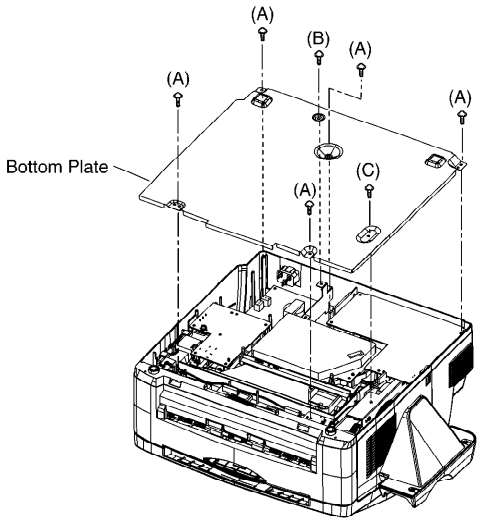


5.11. HOW TO REMOVE THE BOTTOM PLATE

PROCEDURE:B-1

REF.NO.B-1

1) Remove the 5 screws (A).
2) Remove the screws (B).
3) Remove the screw (C).
4) Remove the Bottom Plate.

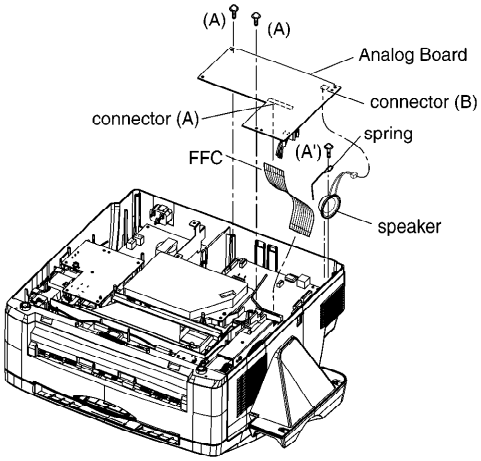


5.12. HOW TO REMOVE THE ANALOG BOARD

PROCEDURE: B-1--> B-2

REF.NO.B-2

1) Remove the 2 screws (A).
2) Remove the connector (A) and (B).
3) Remove the Analog Board.
4) Remove the screw (A').
5) Remove the spring.
6) Remove the speaker.

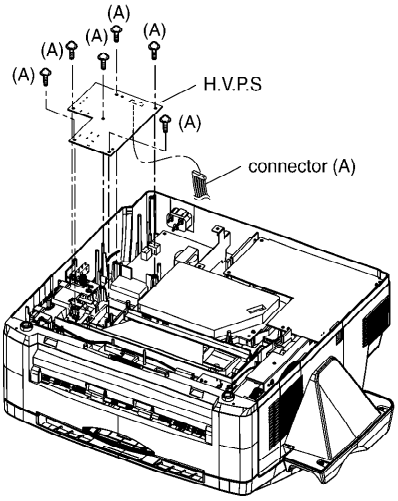


5.13. HOW TO REMOVE THE HIGH VOLTAGE POWER BOARD

PROCEDURE: B-1--> B-3

REF.NO.B-3

1) Remove the 6 screws (A).
2) Remove the connector (A).
3) Remove the H.V.P.S. (High Voltage Power Board).

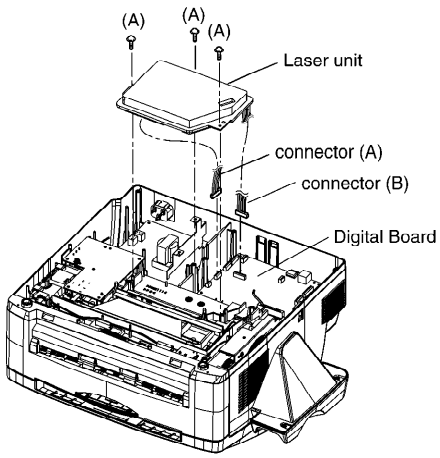


5.14. HOW TO REMOVE THE LASER UNIT

PROCEDURE: B-1--> B-2--> B-4

REF.NO.B-4

1) Remove the 3 screws (A).
2) Remove the connector (A) and (B).
3) Remove the Laser unit.

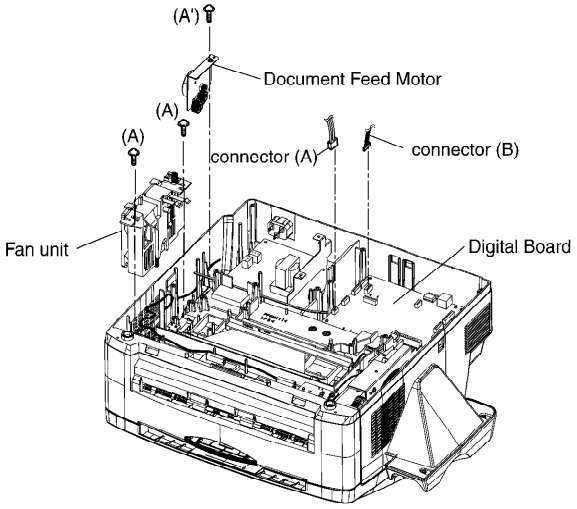


5.15. HOW TO REMOVE THE FAN UNIT

PROCEDURE: B-1--> B-3--> B-2--> B-4--> B-5

REF.NO.B-5

1) Remove the 2 screws (A).
2) Remove the connector (A).
3) Remove the Fan unit.
4) Remove the screw (A').
5) Remove the connector (B).
6) Remove the Document Feed Motor.

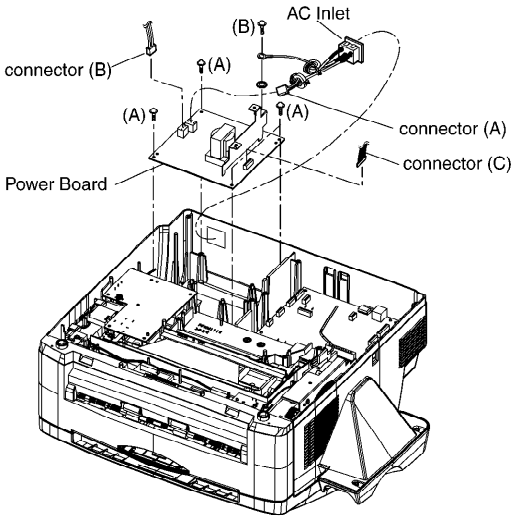


5.16. HOW TO REMOVE THE LOW VOLTAGE POWER BOARD

PROCEDURE: B-1--> B-2--> B-4--> B-6

REF.NO.B-6

1) Remove the screw (B) and connector (A).
2) Remove the AC Inlet.
3) Remove the connector (B) and (C).
4) Remove the 4 screws (A).
5) Remove the Power Board (Low Voltage Power Board).

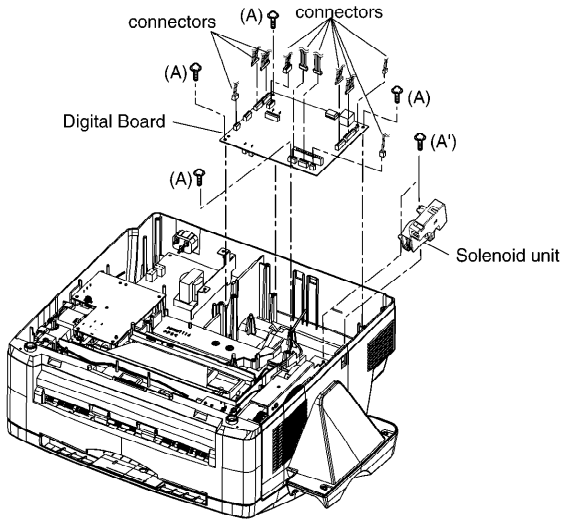


5.17. HOW TO REMOVE THE SOLENOID

PROCEDURE: B-1--> B-2--> B-4--> B-7

REF.NO.B-7

1) Remove the 4 screws (A).
2) Remove the 10 connectors.
3) Remove the Digital Board.
4) Remove the 2 screws (A').
5) Remove the Solenoid unit.

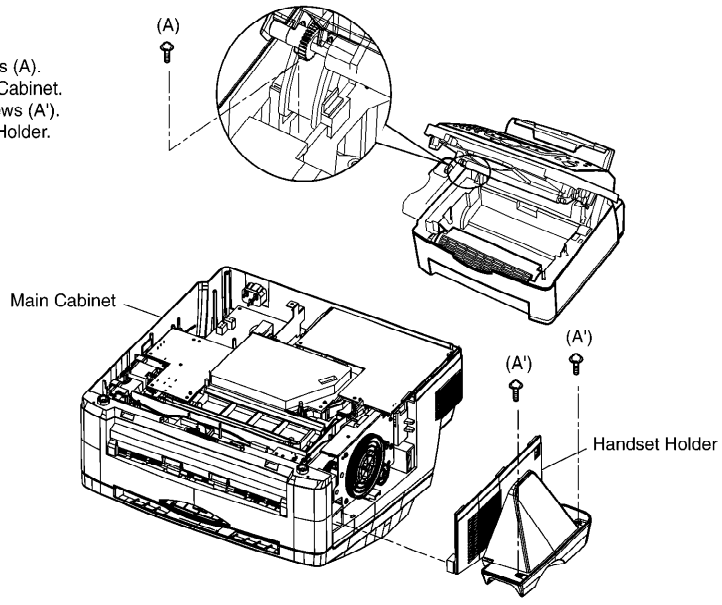


5.18. HOW TO REMOVE THE HANDSET HOLDER

PROCEDURE: A-1--> B-1--> B-8

REF.NO.B-8

1) Remove the screws (A).
2) Reverse the Main Cabinet.
3) Remove the 2 screws (A').
4) Remove Handset Holder.

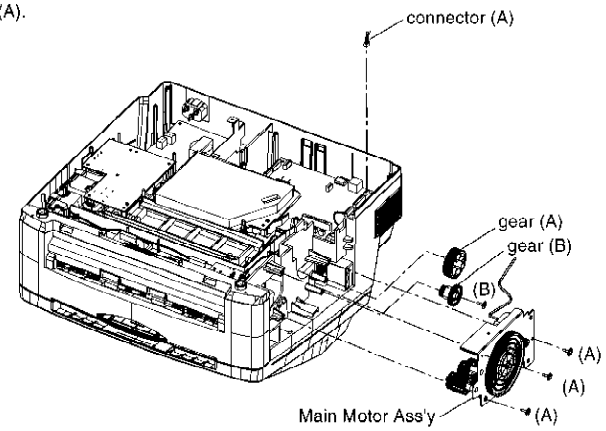


5.19. HOW TO REMOVE THE MAIN MOTOR

PROCEDURE: B-1--> B-2--> B-8--> B-9

REF.NO.B-9

1) Remove the 3 screw (A) and connector (A).
2) Remove the Main Motor Ass'y.
3) Remove the screw (B).
4) Remove the gear (A) and (B).



5.20. HOW TO REMOVE THE FUSER UNIT

PROCEDURE: B-1--> B-10

REF.NO.B-10

First of all,reverse the Main Unit. and remove the bottom Plate.(see the REF.NO.B-1)
1) Remove the connector (A) ,(B) and (C).(Fig-1)
2) Revert the Main Unit.
3) Remove the 2 screws (A).
4) Lift up the Fuser unit from the Main Cabinet.

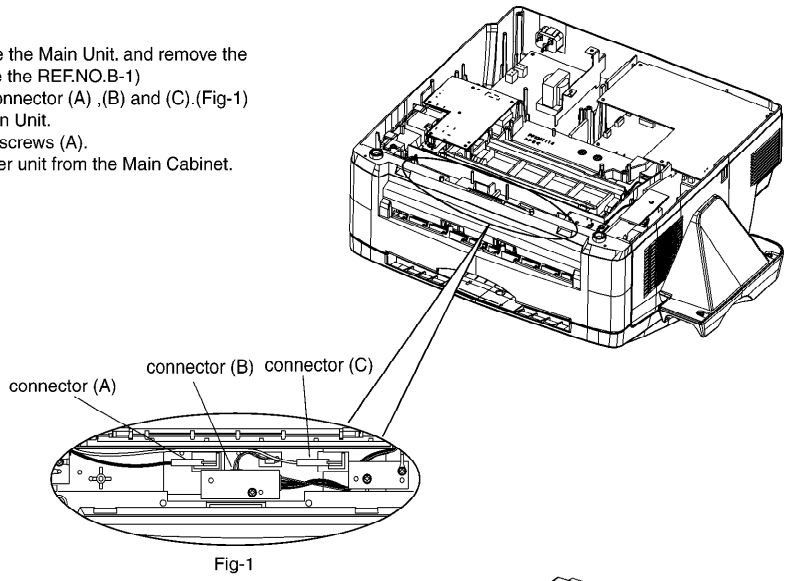
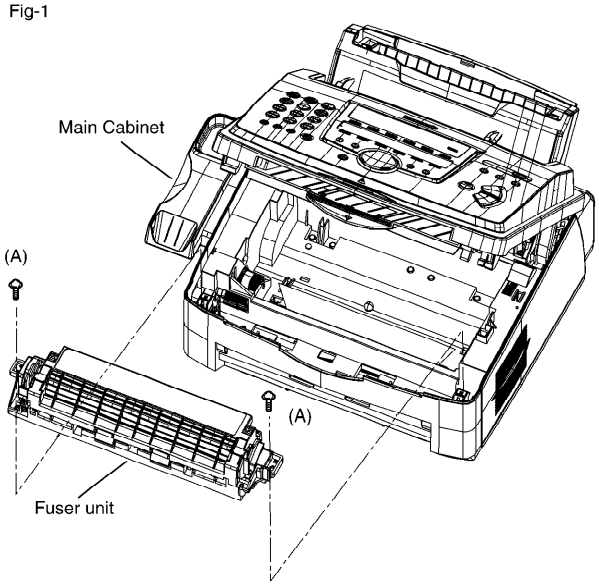


Fig-1



5.21. HOW TO REMOVE THE CIS

PROCEDURE: C-1

REF.NO.C-1

1) Lift open the Front Cover.
2) Pull the tab(gray) back to free it from the pin (white) . on both the left and right sides of the unit (Fig-a).
3) Push the CIS in the direction of an arrow to release the hooks.(Fig-b).
4) Remove the CIS.

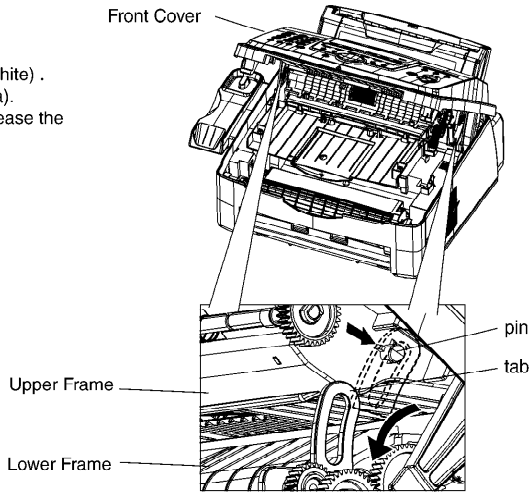


Fig-a

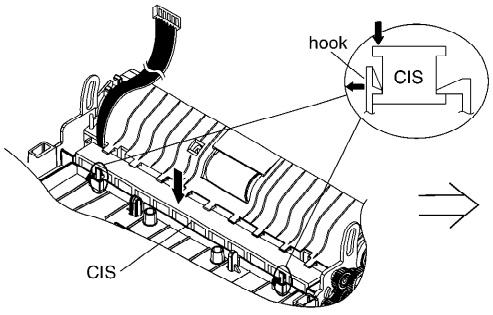


Fig-b

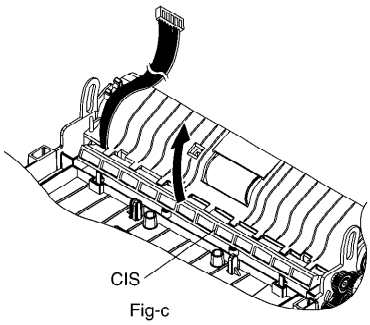
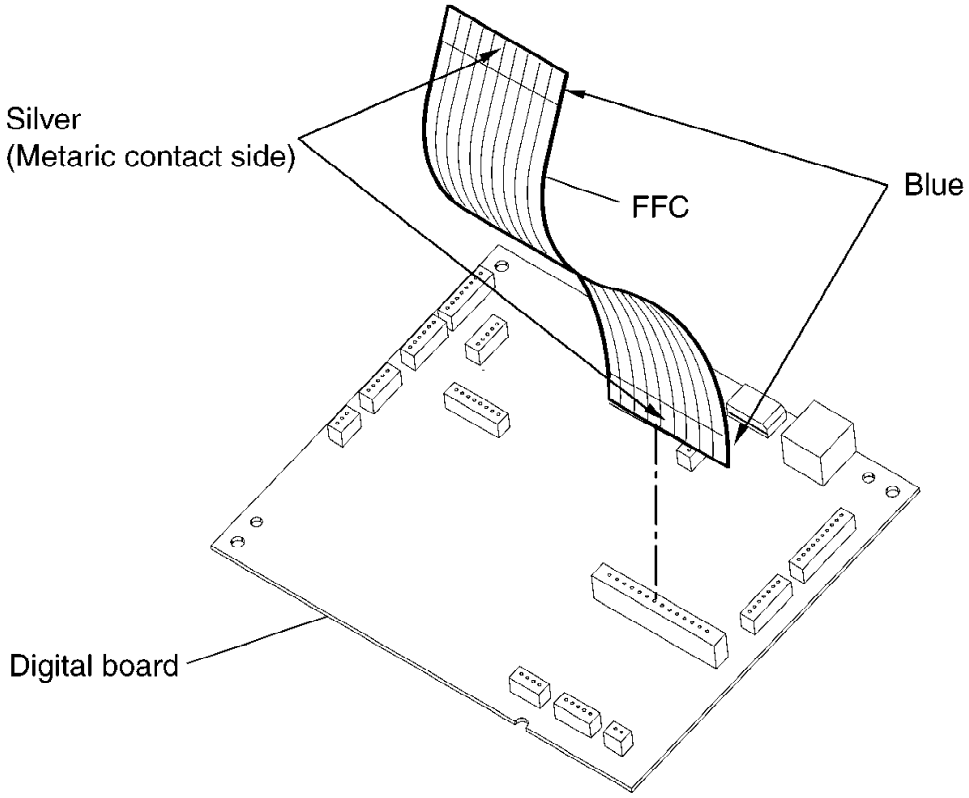


Fig-c

5.22. NOTE FOR ASSEMBLING

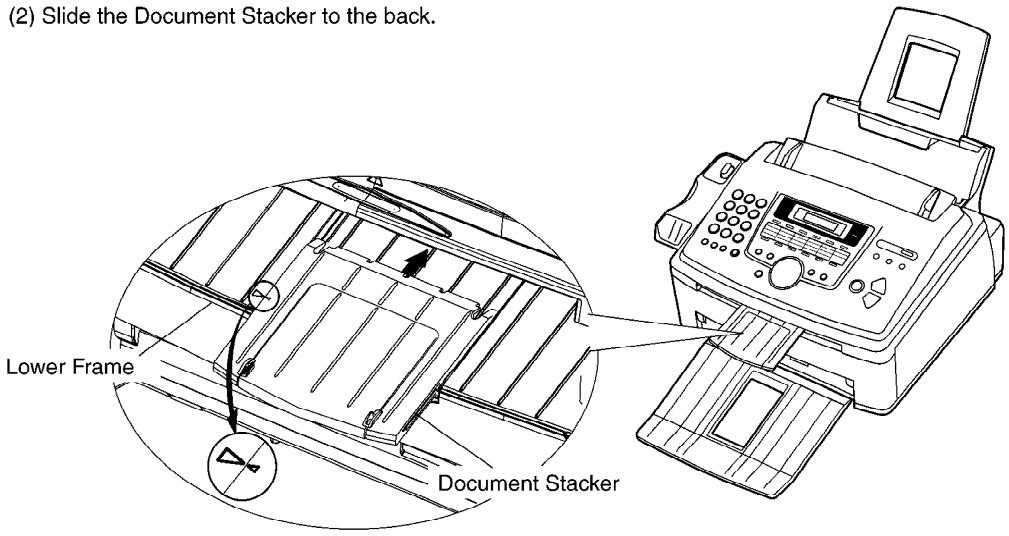
5.22.1. FCC (DIGITAL BOARD)

Install the FFC as following pictures,when you connect the FFC to the digital board.



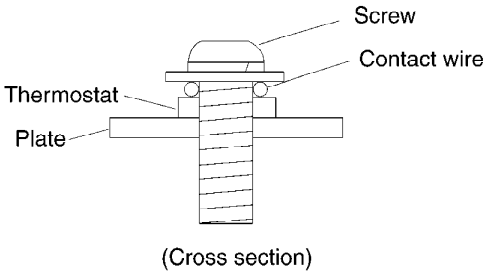
5.22.2. DOCUMENT STACKER

(1) Mark of a Lower Frame and Document Stacker is united and assemble.
(2) Slide the Document Stacker to the back.



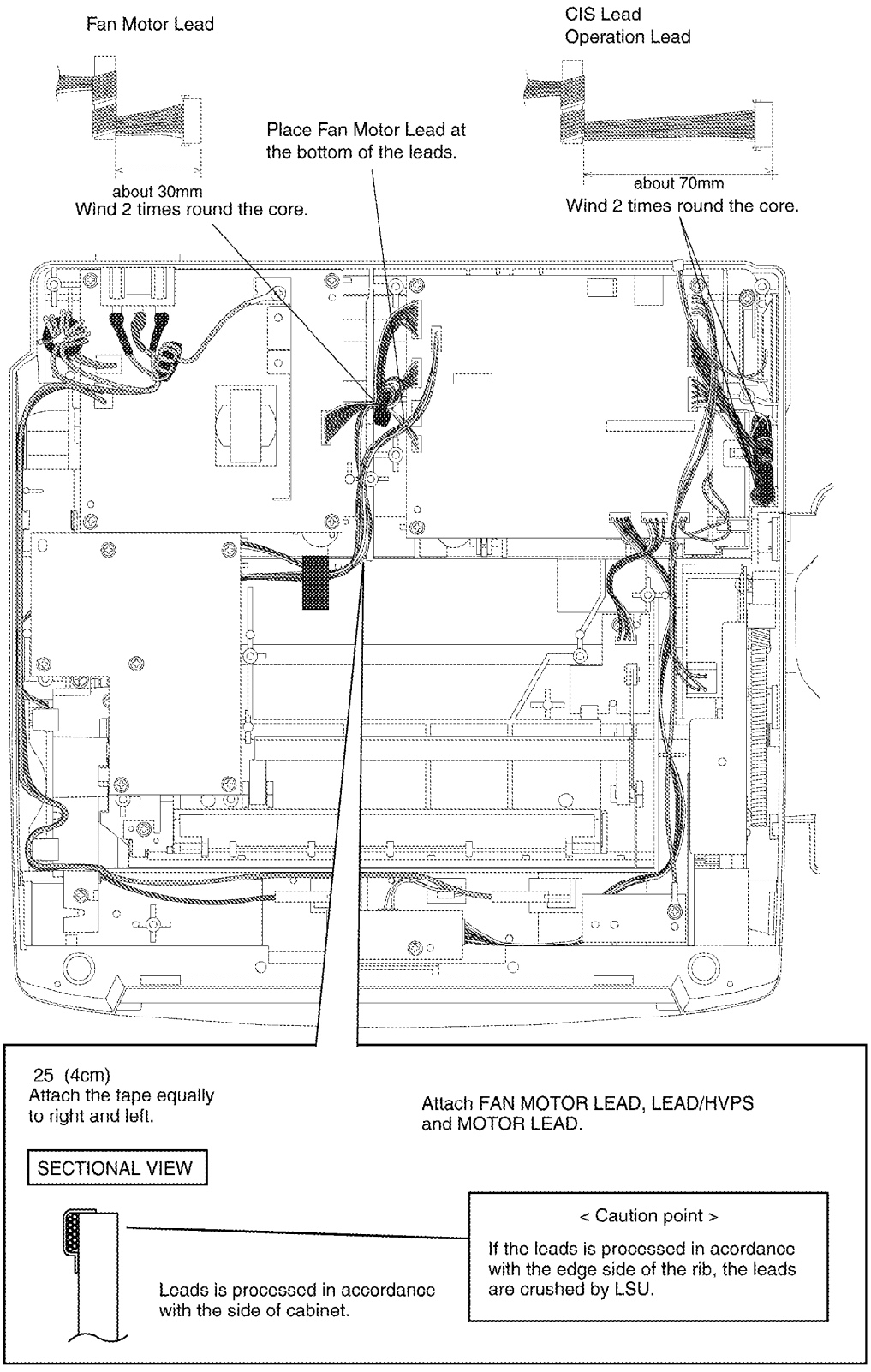
5.22.3. THERMOSTAT

Attach the thermostat correctly, as shown in the right figure.
Do not use the thermostat which changed.



(Cross section)

5.23. INSTALLATION POSITION OF THE LEAD



6. TROUBLESHOOTING GUIDE

6.1. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display. The explanations given in the [ ] are for servicemen only.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE 1	-Polygon motor error. Refer to CALL SERVICE 1 ().
CALL SERVICE 2	-Laser beam error. Replace LSU unit. Refer to CALL SERVICE 2 ().
CALL SERVICE 3	-Fuser unit cannot heat up. Replace fuser unit. Refer to CALL SERVICE 3 ().
CALL SERVICE 4	-Fan motor error. Replace fan motor. Refer to CALL SERVICE 4 ().
CHANGE DRUM	-There is something wrong with the drum unit. Replace the drum unit and the toner cartridge.
CHECK DOCUMENT	-The document is not fed into the unit properly. Reinsert the document. If misfeeding occurs frequentl document feeder rollers and try again.
CHECK DRUM	-The drum unit is not inserted properly. Reinsert it correctly. -The installed drum is worn out. Replace the drum unit with a new one.
CHECK MEMORY	-The memory (telephone numbers, parameters, etc.) has been erased. Re-program.
COVER OPEN	-The front cover is open. Close it.
DIRECTORY FULL	-There is no space to store new entries in navigator directory. Erase unnecessary entries.
DRUM LIFE OVER REPLACE DRUM	-The drum life is complete. Replace the drum unit immediately.
FAILED PICK UP	-Recording paper was not fed into the unit properly. Reinsert the recording paper.
FAX IN MEMORY	-The unit has a document in memory. See the other displayed message instructions to print out the dc
RX MEMORY FULL	-The memory is full of received documents due to lack of recording paper or a recording paper jam, et paper or clear the jammed paper.
LOW TEMP.	-The inside of the unit is extremely cold and cannot be operated. Use the unit in a warmer area. While cannot be operated, the received documents are temporarily stored into the memory, and will be print automatically when the unit warms up.
MEMORY FULL	-When making a copy, the document being stored exceeds the memory capacity of the unit. Press [ST clear the message. Divide the document into sections. -When performing memory transmission, the document being stored exceeds the memory capacity of Transmit the entire document manually.
MODEM ERROR	-There is something wrong with the modem circuit.
NO FAX REPLY	-The other party´s fax machine is busy or has run out of recording paper. Try again.
OUT OF PAPER	-Recording paper is not installed or the unit has run out of paper. Install paper. -Recording paper is not fed into the unit properly. Reinstall paper.
PAPER JAMMED	-A recording paper jam occurred. Clear the jammed paper. [If the printout jams, please refer to RECORDING PAPER JAMS ().]
PLEASE WAIT	-The unit is warming up. Wait for a while.
REDIAL TIME OUT	-The other party´s fax machine is busy or has run out of recording paper. Try again.

DISPLAY MESSAGE	CAUSE AND REMEDY
REMOVE DOCUMENT	-The document is jammed. Remove the jammed document. -Attempted to transmit a document longer than 600 mm (23 5/8"). Press the [STOP] to remove the do Divide the document into two or more sheets and try again. -[Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer t DOCUMENT JAMS ().)
REPLACE DRUM SOON	-The drum life is near to the end. Replace the drum unit as soon as possible.
RX MEMORY FULL	-The memory is full of received documents due to a lack of recording paper or a recording paper jam. or clear the jammed paper.
TONER EMPTY	-The toner life is complete. Replace the toner cartridge immediately.
TONER LOW	-The toner life is near to the end. Replace the toner cartridge as soon as possible.
TRANSMIT ERROR	-A transmission error occurred. Try again.
WARM UP	-The inside of the unit is too cold. Let the unit warm up. Wait for a while.
WRONG PAPER	-The fax message was printed on paper which is shorter than letter size paper. Use the appropriate si -To prevent the drum unit becoming dirty, use A4 or letter size paper.

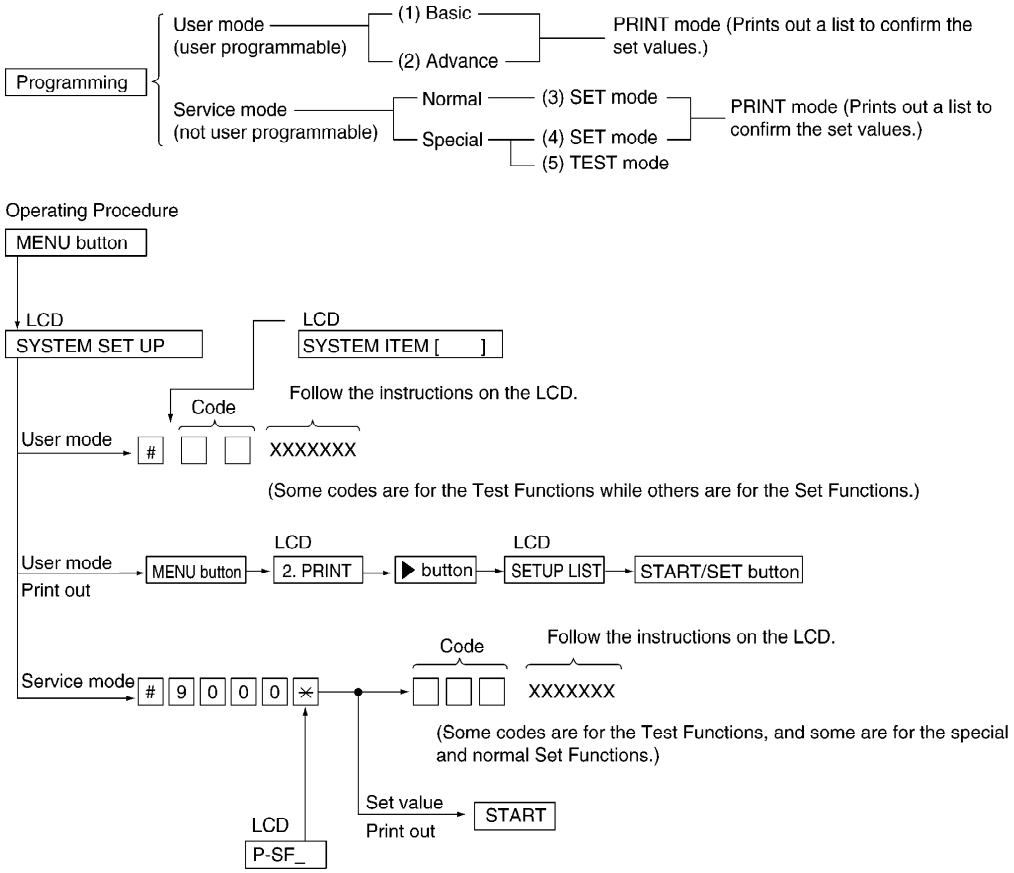
6.2. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine.
This facilitates communication between the user and the service man while programming the unit.

6.2.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

6.2.2. OPERATION FLOW



6.2.3. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	030	----------
502	Flash time	X 10 ms	01~99	70	----------
503	Dial speed select	1:10 pps 2: 20 pps	1, 2	1	----------
507	V.34 transmit speed selection	0: DISABLE 1 :33,600 2: 31,200 3: 28,800 4: 26,400 5: 24,000 6: 21,600 7:19,200 8: 16,800	0~8	1	----------

Code	Function	Set Value	Effective Range	Default	Remarks
508	V.34 receive speed selection	0: DISABLE 1 :33,600 2: 31,200 3: 28,800 4: 26,400 5: 24,000 6: 21,600 7:19,200 8: 16,800	0~8	1	----------
514	Bell signal detect time	X 100msec	1~9	6	----------
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See Symptom/Countermeasu for long distance and internat calls in ().
521	International mode select	1:ON 2: OFF	1, 2	1	See Symptom/Countermeasu for long distance and internat calls in ().
522	Auto standby select	1:ON 2: OFF	1, 2	1	The resolution reverts to the c when transmission is comple
523	Receive equalizer select	1: 0 km / 2: 1.8 km / 3: 3.6 km / 4: 7.2 km	1~4	1	Set RX equalizer to automatic
524	Transmission equalizer select	1: 0 km / 2: 1.8 km / 3: 3.6 km / 4: 7.2 km	1~4	1	
529	Call Service Clear				
550	Memory Clear				To reset the value to the defau except the top margin (#853), margin (#854), time/day (#001 (#002), Fax no. (#003), History Directory.
551	ROM check				See ().
552	DTMF single tone test	1:ON 2: OFF	1, 2	2	See ().
553	Monitor on FAX communication select	1:OFF 2: PHASE B 3 :ALL	1~3	1	Sets whether to monitor the li signal with the unit's speaker FAX communication or not.
554	Modem test				See ().
555	Scan check				See ().
556	Motor test			0	See ().
557	LED test				See ().
558	LCD test				See ().
561	KEY test				See ().

Code	Function	Set Value	Effective Range	Default	Remarks
570	BREAK % select	1:61% 2: 67%	1, 2	1	Sets the % break of pulse dial according PBX.
571	ITS auto redial time set	X number of times	00~99	00	Selects the number of times t is redialed (not including the f dial).
572	ITS auto redial line disconnection time set	X second	001~999	065	Sets the interval of ITS rediali
573	Remote turn-on ring number set	X number of rings	01~99	10	Sets the number of rings befo unit starts to receive a docum the TEL mode.
590	FAX auto redial time set	X number of times	00~99	02	Selects the number of redial t during FAX communication (r including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	065	Sets the FAX redial interval du FAX communication.
592	CNG transmit select	1:OFF / 2: ALL / 3: AUTO	1~3	2	Lets you select the CNG outpu during FAX transmission. ALL is output at phase A. AUTO: C output only when automatic d is performed. OFF: CNG id no at phase A. Refer to ().
593	Time between CED and 300bps	1:75 msec / 2:500 msec / 3:1 sec	1~3	1	See Symptom/Countermeasur for long distance and internat calls in (). Refer to () and ().
594	Overseas DIS detection select	1:detects at the 1st time / 2: detects at the 2st time	1, 2	1	See Symptom/Countermeasur for long distance and internat calls in (). Refer to () and ().
595	Receive error limit value set	1: 5% / 2: 10% / 3: 15% / 4: 20%	1~4	2	If the number of errors during transmission exceeds this val sending side terminates the c
596	Transmit level set	X dBm	- 15~00	10	Selects the FAX transmission Refer to ()and ().
598	Receiving sensitivity	43= -43 dBm	20~48	43	Used when there is an error p Refer to ().
599	ECM frame size	1:256 2:64	1, 2	1	----------
628	H.V.P.S. check				See ().

Code	Function	Set Value	Effective Range	Default	Remarks
630	Paper Jam Cause Distinction Code				0:No Paper Jam 1:The paper was pulled into th 2:The paper was longer than t maximum length of the regist sensor. 3:The paper exit was not dete after the registration. 4:The paper was longer than t maximum length of the paper sensor. 5:The register sensor or pape sensor was turned ON before motor started to rotate. 6:The register sensor chattere 7:The paper exit sensor chatt
639	LSU test				See ().
651	Write system program into the Flash Rom with a tool.				See the parts number of the t The tool includes the operatin manual for writing program.
655	Cause Distinction Code of Call Service 3				See ().
717	Transmit speed selection	1:14400 2: 12000 3: 9600 4:7200 5: 4800 6: 2400	1-6	1	Adjusts the speed to start trai during FAX transmission. Ref and
718	Receive speed selection	1:14400 2: 12000 3: 9600 4:7200 5: 4800 6: 2400	1-6	1	Adjusts the speed to start trai during FAX reception. Refer t
721	Pause tone detect	1:ON 2: OFF	1, 2	2	Selects the tone detection for in dialing.
722	Redial tone detect	1:ON 2: OFF	1, 2	2	Sets the tone detection mode redialing.
763	CNG detect time for friendly reception	1:10 sec / 2 :20 sec / 3: 30 sec	1-3	3	Selects the CNG detection tor friendly reception.
771	T1 timer	1:35 sec / 2 :60 sec	1, 2	1	Sets a higher value when the response from the other party more time during FAX transm
774	T4 timer	X 100 sec	00-99	00	Use this function when delay in the line and communicatior Mobile comm) does not work

Code	Function	Set Value	Effective Range	Default	Remarks
815	Sensor & Vox check				See ().
852	Print test pattern				See ().
853	Top margin		1~5	3	----------
854	Left margin		1-7	4	----------
874	DTMF ON time	X msec	060-200	90	----------
875	DTMF OFF time	X msec	060-200	90	----------
880	History list				See ().
881	Journal 2 list				See ().
882	Journal 3 list				See ().

6.3. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test Mode	Type of Mode	Code Operation after code input	Function
MOTOR TEST	Service Mode	"5" "5" "6" START	0: Recording paper feed 1: Auto Document feed (STANDARD) 2: Auto Document feed (FINE) 3: Auto Document feed (SUPER FINE)
MODEM TEST	Service Mode	"5" "5" "4" START	Telephone line circuit is connected automatically, the following signals on the circuit line. 1) OFF 2) 14400bps 3) 12000bps 4) 9600bps 5) 7200 bps 6) 4800bps 7) 2400bps 8) 300bps 9) 2100Hz 10) 1100Hz
ROM CHECK	Service Mode	"5" "5" "1" START	Indicates the version and checks the sum of the F
LCD CHECK	Service Mode	"5" "5" "8" START	Checks the LCD indication. Illuminates all the dots to check if they are norma
DTMF SINGLE TEST	Service Mode	"5" "5" "2" 1....ON 2....OFF	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer to SINGLE TONE TRANSMIT SELECTION ().
LED CHECK	Service Mode	"5" "5" "7" START	All LEDs above the operation panel board flash or or are illuminated.
KEY CHECK	Service Mode	"5" "6" "1" START (any key)	Checks the button operation. Indicates the button code on the LCD while the bu pressed. Refer to BUTTON CODE TABLE ().
CIS TEST	Service Mode	"5" "5" "5"	LED lights up, CIS scanning.

Test Mode	Type of Mode	Code Operation after code input	Function
LSU TEST	Service Mode	“6” “3” “9”	Laser radiates, Polygon rotates
MEMORY CLEAR	Service Mode	“5” “5” “0” START	To reset the value to the default one, except the tc (#853), left margin (#854), time/day (#001), logo (#(no. (#003), History and Directory. Please restart a power supply after clearing a mer
High Voltage Power Supply Board CHECK	Service Mode	“6” “2” “8” START	Refer to HIGH VOLTAGE VALUE CHECK POINT ()
FAN TEST	Service Mode	“6” “7” “7” START	0:TEST OFF 1:High-speed rotation 2:Low-speed rotation

Test Mode	Type of Mode	Code Operation after code input	Function
SENSOR CHECK	Service Mode	“8” “1” “5”	First of all, press the copy button, and confirm the ON/OFF. For each sensor’s operation, refer to SENSORS A SWITCHES SECTION (). [D S C P R E D T * 3F * D 4 * V] : LCD DISPLAY D: Document sensor D: Document set -: No document S: Paper Feed Sensor S: Read position -: No read position C: Printer Cover Switch C: Open -: Close P: Paper sensor P: Recording paper set -: No recording paper R: Regist Sensor R: Detect recording paper -: Not defect recording paper E: Exit Sensor E: Detect recording paper -: Not detect recording paper D: Drum Sensor D: DRUM set -: No DRUM

			T: Toner Sensor **T: Toner sensor ON** **-: Toner sensor OFF**
			***: None**
			3F: Temperature of THERMISTOR **Hex (00-FF)**
			***: None**
			D4: Temperature of Atmosphere **Hex (00-FF)**
			***: None**
			V: VOX signal **V: Detect the tone on the line** **-: Not detect**

Test Mode	Type of Mode	Code Operation after code input	Function
PRINT TEST PATTERN	Service Mode	"8" "5" "2" START	1. Press "852" then the SET key in the service mo 2. As "PATNO =" is displayed on the LCD, enter tl pattern No. and press the SET key. 3. When "No. = "is displayed on the LCD, enter th number and press the SET key. (Press "00" for th printing.) 4. "MODE" is displayed on the LCD. Press "0" to s printing or press "1" to go to the next screen. 5. When "1" is pressed at MODE, "INTVL = "is dis the LCD. Enter the printing interval (00-99 sec). 6. The printing repeats the designated number of the programmed printing intervals.

Note:

The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

6.3.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	Low Frequency (Hz)	Key	High Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) / Low (Hz)	1209	1336	1477
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	"*"	"0"	"#"

Note:

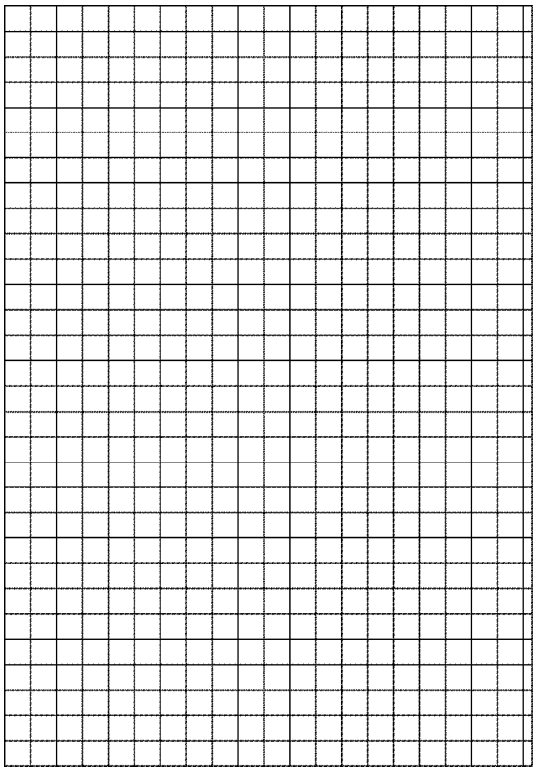
After performing this check, do not forget to turn the setting off. otherwise, dialing in DTMF signal will not work.

6.3.2. BUTTON CODE TABLE

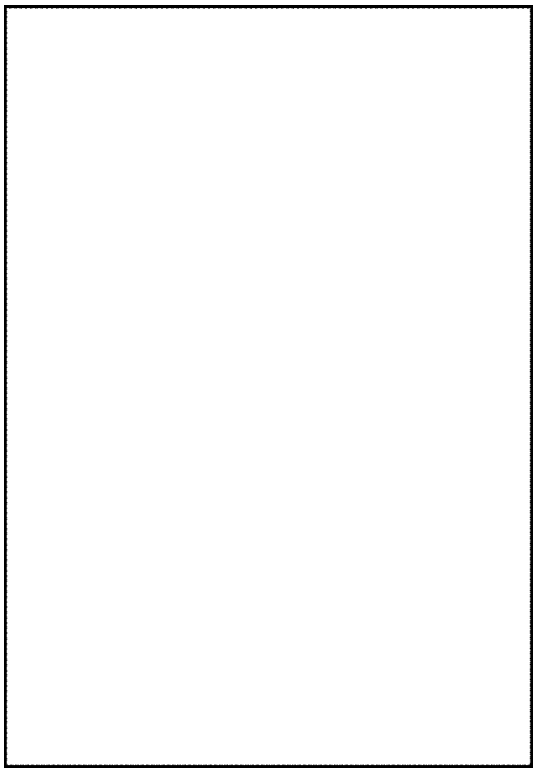
Code	Button Name	Code	Button Name	Code	Button Name
00	NO INPUT	31	1	49	QUICK SCAN
–	STOP	32	2	4C	CALLER ID PRINT
02	RESOLUTION	33	3	4D	COLLATE
04	FAX START	34	4	5B	BROADCAST 1
05	LOWER	35	5	5C	BROADCAST 2
06	COPY START	36	6	5D	MANUAL BROAD
08	MONITOR	37	7	5E	STATION 4
0A	HANDSET MUTE	38	8	5F	STATION 5
0C	AUTO ANSWER	39	9	60	STATION 6
1E	NAVIGATOR NEXT	3A	0	61	STATION 7
1F	NAVIGATOR PREV	3B	*	62	STATION 8
20	MENU	3C	#	63	STATION 9
22	HELP	3D	REDIAL/PAUSE	64	STATION 10
24	DIRECTORY PROGRAM	3E	FLASH	65	STATION 11
25	VOLUME +	47	CALLER ID SEARCH		
26	VOLUME —	48	CALLER IQ		

6.3.3. PRINT TEST PATTERN

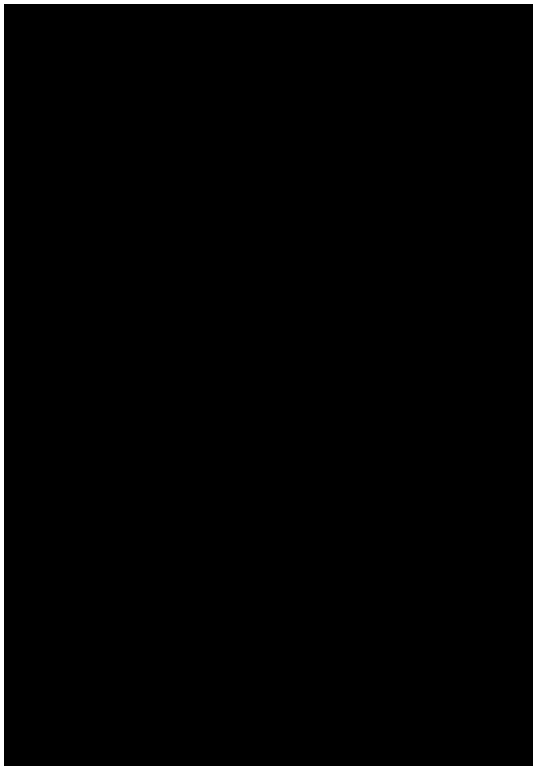
1. NO. 01



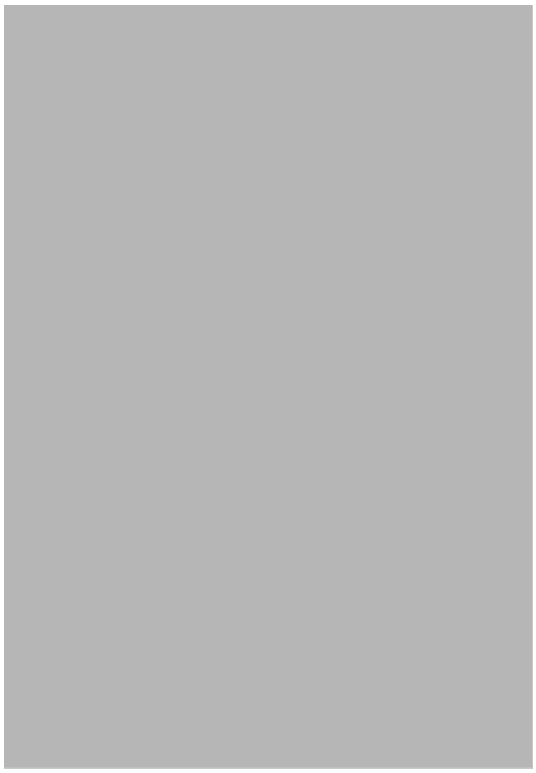
2. NO.08



3. NO.20



4. NO.19



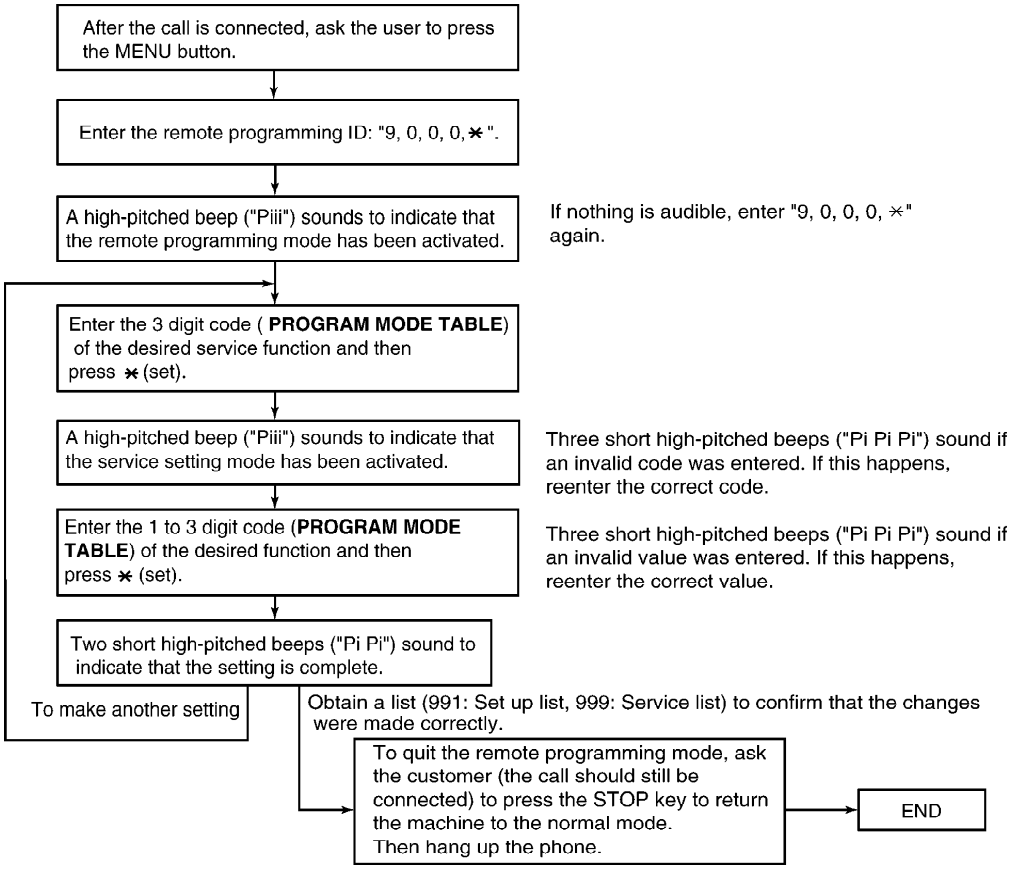
6.4. REMOTE PROGRAMMING

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (PROGRAM MODE TABLE()). The function used to accomplish this is remote programming.
First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer's fax machine.
Based on this, the parameters for the desired codes can be changed.
The procedure for changing and listing parameters is described on ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES(). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Hint:
Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

6.4.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING

SERVICE CODES



CROSS REFERENCE:
PROGRAM MODE TABLE ()

6.4.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	dd/mm/yy hh:mm	01/Jan/2003	NG
002	Your logo	---------	None	NG
003	Your fax telephone number	---------	None	NG
004	Transmission report mode	2:ON / 3:OFF / 1:ERROR	ERROR	OK
006	FAX ring count	1 to 5 rings (for ext. TAM)	3	OK
012	Remote TAM activation	ON/ID=11 / OFF	OFF	NG
013	Dialing Mode	2:TONE / 1:PULSE	TONE	OK
016	Paper size	LETTER / A4 / LEGAL	LETTER	NG
017	Ringer pattern	A / B / C	A	NG
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	1:NEXT FAX / 2:ERROR / 3: OFF	ERROR	OK
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto CALLER ID list	1:ON / 2:OFF	ON	OK
031	Distinctive ring	2:ON / 1:OFF	OFF	OK
032	Ring pattern set	1:B-D / 2:A / 3:B / 4:C / 5:D	B-D	OK
037	Auto REDUCTION	1:ON / 2:OFF	ON	OK
039	LCD contrast	NORMAL / DARKER	NORMAL	NG
041	Remote FAX activation code	ON / OFF	ON CODE=* #9	NG
044	Receive alert	1:ON / 2:OFF	ON	OK
046	Friendly receive	1:ON / 2:OFF	ON	OK
068	ECM Selection	1:ON / 2:OFF	ON	OK
076	FAX tone	1:ON / 2:OFF	ON	OK
079	Toner save	1:ON / 2:OFF	OFF	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001-600 x 100msec	030	OK
502	Flash time	01-99 x 10ms	70	OK
503	Dial speed selest	1:10pps / 2:20pps	10pps	OK
507	V.34 transmit speed select	0:DISABLE /1:33600bps / 2: 31200 bps /3:28800bps /4: 26400bps/ 5:24000bps /6: 21600bps /7:19200bps/ 8: 16800bps	33600bps	OK
508	V.34 receive speed select	0:DISABLE /1:33600bps / 2: 31200 bps /3:28800bps /4: 26400bps/ 5:24000bps /6: 21600bps /7:19200bps/ 8: 16800bps	33600bps	OK
514	Bell signal detect time	1-9 x 100msec	6	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100Hz	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0kms / 2:1.8km / 3:3.6km / 4 :7.2km	0 km	OK

Code	Function	Set Value	Default	Remote Setting
524	Transmission equalizer select	1:0kms / 2:1.8km / 3:3.6km / 4 :7.2km	0 km	OK
529	Memory clear for Call Service	---------	---------	NG
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
561	Key test	---------	---------	NG
570	Break % select	1:61% / 2:67%	61%	OK
571	ITS auto redial time set	00-99	00	OK
572	ITS auto redial line disconnection time set	001-999sec	065	OK
573	Remote turn-on ring number	01-99	10	OK
590	FAX auto redial time set	00-99	02	OK
591	FAX auto redial line disconnection time set	001-999sec	065	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection select	1:1st / 2:2nd	1st	OK
595	Receive error limit value set	1:5% / 2:10% / 3:15% / 4:20%	10%	OK
596	Transmit level set	-15 to 00dBm	10	OK
598	Receiving Sensitivity	20-48	43	OK
599	ECM Frame size	1:256 / 2:64	256byte	OK
628	H.V.P.S check	---------	---------	NG
630	Paper jam cause distinction	---------	---------	NG
639	LSU test	---------	---------	NG
651	White system program into the Flash ROM	---------	---------	NG
655	Cause distinction code of call service 3	---------	---------	NG
717	Transmit speed select	1:14400/ 2:12000/ 3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	:14400/ 2:12000/ 3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK
721	Pause tone detect	1:ON / 2:OFF	OFF	OK
722	Redial tone detect	1:ON / 2:OFF	OFF	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
774	T4 timer	00-99 × 100msec	00	OK
815	Sensor test	---------	---------	NG

Code	Function	Set Value	Default	Remote Setting
852	Print test pattern	---------	---------	NG
853	Top margin	1-5	3	OK
854	Left margin	1-7	4	OK
874	DTMF ON time	060~200msec	90	OK
875	DTMF OFF time	060~200msec	90	OK
880	History list	1:Start	---------	NG
881	Journal 2	---------	---------	NG
882	Journal 3	---------	---------	NG
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
995	Journal 2 list	1:Start	---------	OK
996	Journal 3 list	1:Start	---------	OK
998	History list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

OK means “can set”.
NG means “can not set”.

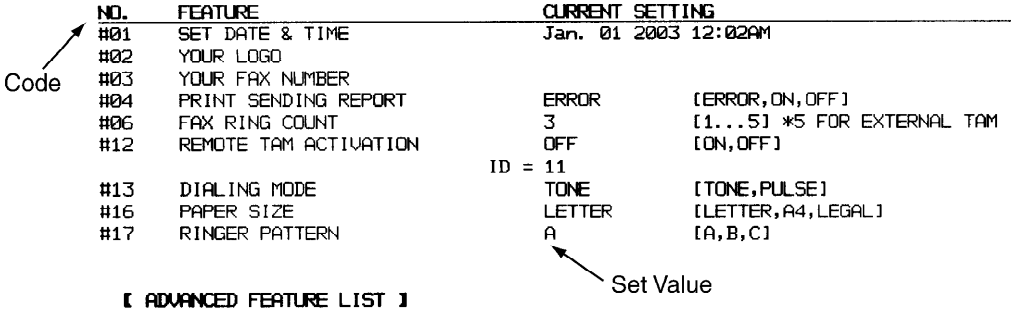
Note:
Refer to SERVICE FUNCTION TABLE () for descriptions of the individual codes.

Example:
If you want to set value in the “004 Transmission report mode”, press the dial key number 1, 2 or 3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

6.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

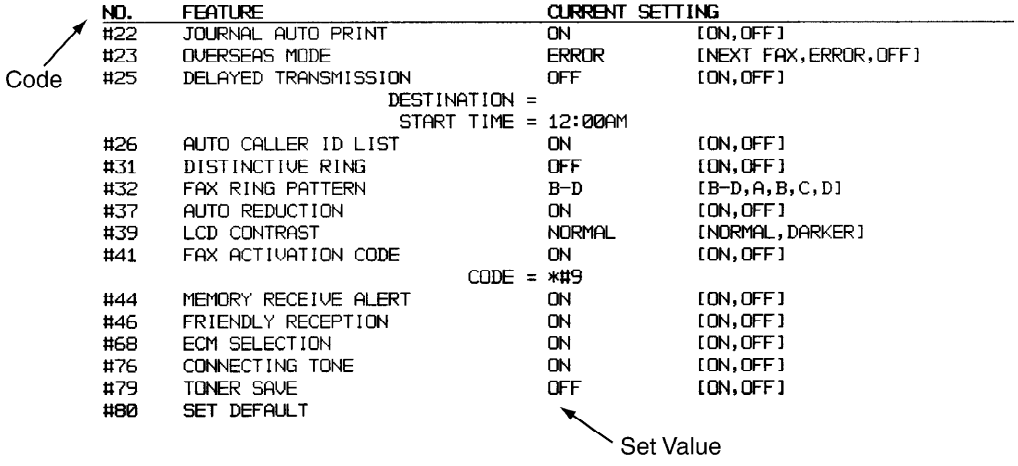
SETUP LIST

[BASIC FEATURE LIST]



NO.	FEATURE	CURRENT SETTING	
#01	SET DATE & TIME	Jan. 01 2003 12:02AM	
#02	YOUR LOGO		
#03	YOUR FAX NUMBER		
#04	PRINT SENDING REPORT	ERROR	[ERROR,ON,OFF]
#06	FAX RING COUNT	3	[1...5] *5 FOR EXTERNAL TAM
#12	REMOTE TAM ACTIVATION	OFF	[ON,OFF]
	ID = 11		
#13	DIALING MODE	TONE	[TONE,PULSE]
#16	PAPER SIZE	LETTER	[LETTER,A4,LEGAL]
#17	RINGER PATTERN	A	[A,B,C]

[ADVANCED FEATURE LIST]



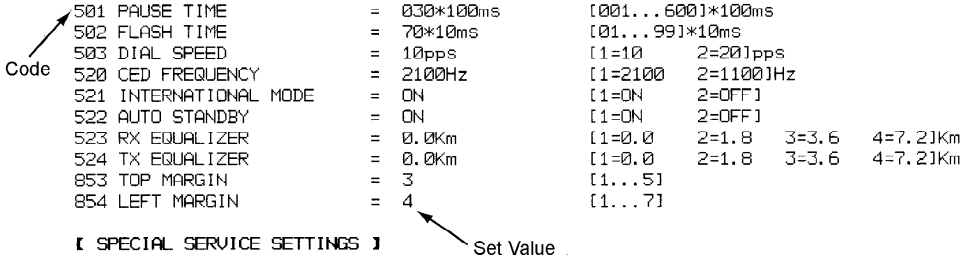
NO.	FEATURE	CURRENT SETTING	
#22	JOURNAL AUTO PRINT	ON	[ON,OFF]
#23	OVERSEAS MODE	ERROR	[NEXT FAX,ERROR,OFF]
#25	DELAYED TRANSMISSION	OFF	[ON,OFF]
	DESTINATION =		
	START TIME = 12:00AM		
#26	AUTO CALLER ID LIST	ON	[ON,OFF]
#31	DISTINCTIVE RING	OFF	[ON,OFF]
#32	FAX RING PATTERN	B-D	[B-D,A,B,C,D]
#37	AUTO REDUCTION	ON	[ON,OFF]
#39	LCD CONTRAST	NORMAL	[NORMAL,DARKER]
#41	FAX ACTIVATION CODE	ON	[ON,OFF]
	CODE = *#9		
#44	MEMORY RECEIVE ALERT	ON	[ON,OFF]
#46	FRIENDLY RECEPTION	ON	[ON,OFF]
#68	ECM SELECTION	ON	[ON,OFF]
#76	CONNECTING TONE	ON	[ON,OFF]
#79	TONER SAVE	OFF	[ON,OFF]
#80	SET DEFAULT		

FOR FAX ADVANTAGE ASSISTANCE, PLEASE CALL 1-800-HELP-FAX (435-7329).

Note:
The above values are the default values.

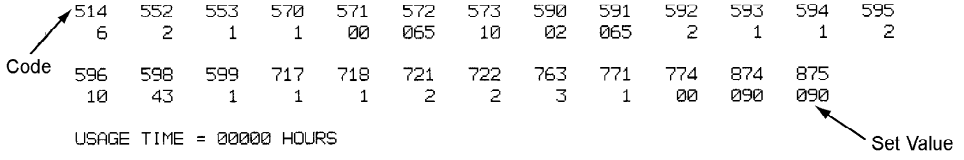
6.4.4. SERVICE MODE SETTINGS (Example of a printed out list)

[SERVICE DATA LIST]



501 PAUSE TIME	=	030*100ms	[001...600]*100ms	
502 FLASH TIME	=	70*10ms	[01...99]*10ms	
503 DIAL SPEED	=	10pps	[1=10 2=20]pps	
520 CED FREQUENCY	=	2100Hz	[1=2100 2=1100]Hz	
521 INTERNATIONAL MODE	=	ON	[1=ON 2=OFF]	
522 AUTO STANDBY	=	ON	[1=ON 2=OFF]	
523 RX EQUALIZER	=	0.0Km	[1=0.0 2=1.8 3=3.6 4=7.2]Km	
524 TX EQUALIZER	=	0.0Km	[1=0.0 2=1.8 3=3.6 4=7.2]Km	
853 TOP MARGIN	=	3	[1...5]	
854 LEFT MARGIN	=	4	[1...7]	

[SPECIAL SERVICE SETTINGS]



514	552	553	570	571	572	573	590	591	592	593	594	595
6	2	1	1	00	065	10	02	065	2	1	1	2

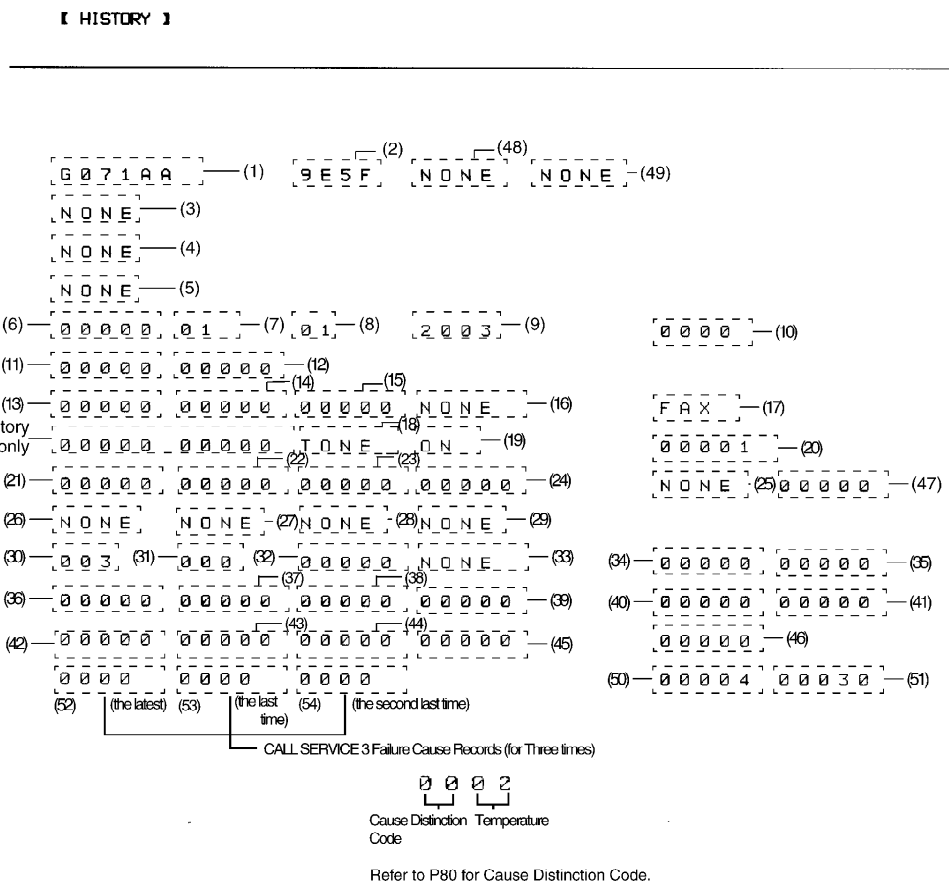
596	598	599	717	718	721	722	763	771	774	874	875
10	43	1	1	1	2	2	3	1	00	090	090

USAGE TIME = 00000 HOURS

Note:

The above values are the default values.

6.4.5. HISTORY (Example of a printed out list)



Note:
See the following descriptions of this report. Item No. (1) ~ (49) are corresponding to the listed items in DESCRIPTIONS OF THE HISTORY REPORT().

6.4.5.1. DESCRIPTIONS OF THE HISTORY REPORT

(1) ROM VERSION
FLASH ROM version

(2) SUM
FLASH ROM internal data calculation.
(3) YOUR LOGO
The user logo recorded in the unit. If it is not recorded, NONE will be displayed.
(4) YOUR TELEPHONE NUMBER
The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.
(5) Not used
(6) FACTORY - CUSTOMER
This shows how many days from factory production until the user turns ON the unit.
(7) MONTH
The shows the very first month, date, year and time set by the user after they purchased the unit.
(8) DAY
The shows the very first month, date, year and time set by the user after they purchased the unit.
(9) YEAR
The shows the very first month, date, year and time set by the user after they purchased the unit.
(10) TIME
The shows the very first month, date, year and time set by the user after they purchased the unit.
(11) USAGE TIME
The amount of time the unit has been powered ON.
(12) FACTORY - NOW
This shows how many days from factory production until the user prints out this history list.
(13) TEL MODE
The amount of time the TEL mode setting was used.
(14) FAX MODE
The amount of time the FAX mode setting was used.
(15) Not used
(16) Not used
(17) FINAL RECEIVE MODE
The last set receiving mode by the user.
(18) TONE/PULSE SELECTION
The most recently used setting used, either TONE or PULSE.
(19) RECEIVE REDUCTION
The compression rate when receiving.
(20) SETTING NO. OF DIRECTORY
The recorded directory stations (one touch dial).
(21) NUMBER OF COPY
The number of pages copied.
(22) NUMBER OF RECEIVE
The number of pages received.
(23) NUMBER OF SENDING
The number of pages sent.
(24) NUMBER OF CALLER ID
The number of times Caller ID was received.
(25) Not used
(26) Not used
(27) Not used
(28) Not used
(29) Not used
(30) Not used

(31) NUMBER OF PRINTING HELP
The number of help lists printed until now.
(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION
The number of faxes received that were divided into more than one sheet since the unit was purchased.
(33) Not used.
(34), (35) Not used.
(36) FAX MODE
Means the unit received a fax message in the FAX mode.
(37) MAN RCV
Means the unit received a fax message by manual operation.
(38) FRN RCV
Means the unit received a fax message by friendly signal detect.
(39) Not used
(40) RMT DTMF
Means the unit detected DTMF (Remote Fax activation code) entered remotely.
(41) PAL DTMF
Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
(42) TURN-ON
Means the unit started to receive after 10 rings. (Remote Turn On: Service Code #573)
(43) Not used
(44) IDENT
Means the unit detected Ring Detection.
(45) Not used
(46) Not used
(47) Not used
(48) Not Used
(49) Not Used
(50) Printing number of the drum unit
(51) Paddle rotation number of the drum unit
(52) CALL SERVICE 3 failure cause record (the latest)
(53) CALL SERVICE 3 failure cause record (the last time)
(54) CALL SERVICE 3 failure cause record (the second last time)

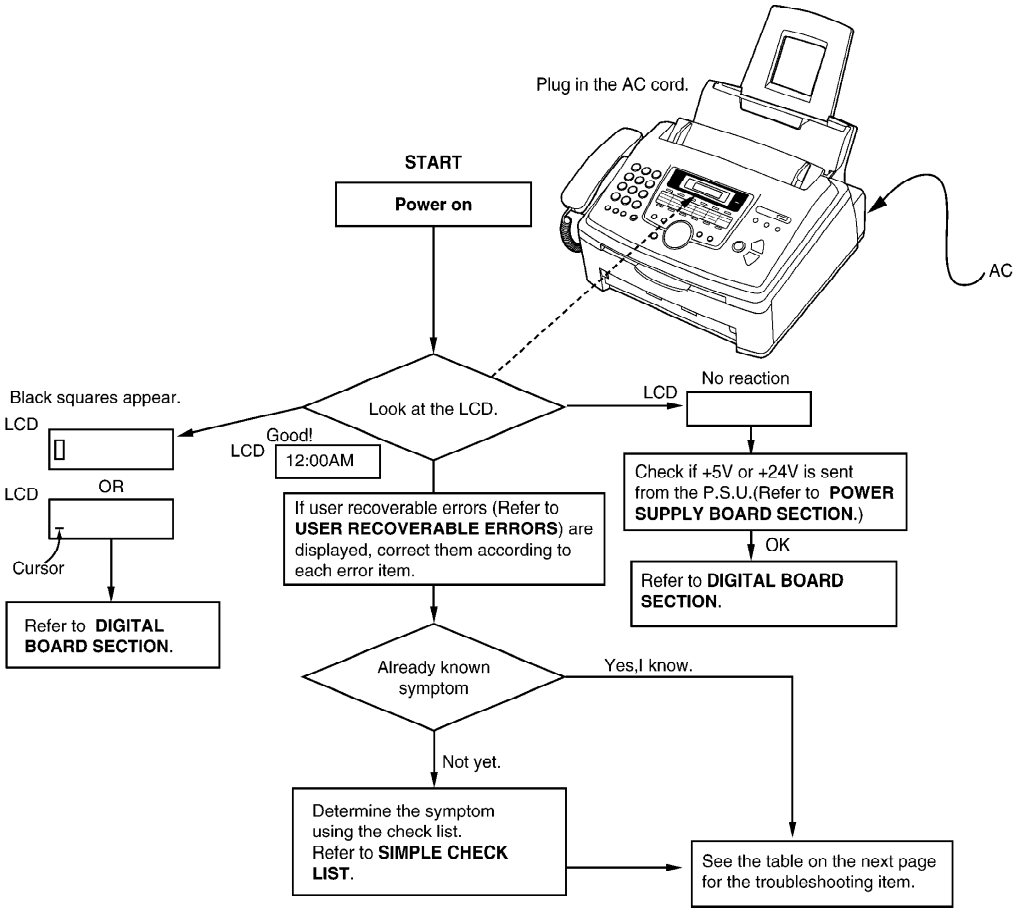
6.5. TROUBLESHOOTING DETAILS

6.5.1. OUT LINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on SIMPLE CHECK LIST(). Difficult problems may be hard to determine, so repeated testing is necessary.

6.5.2. STARTING TROUBLE SHOOTING

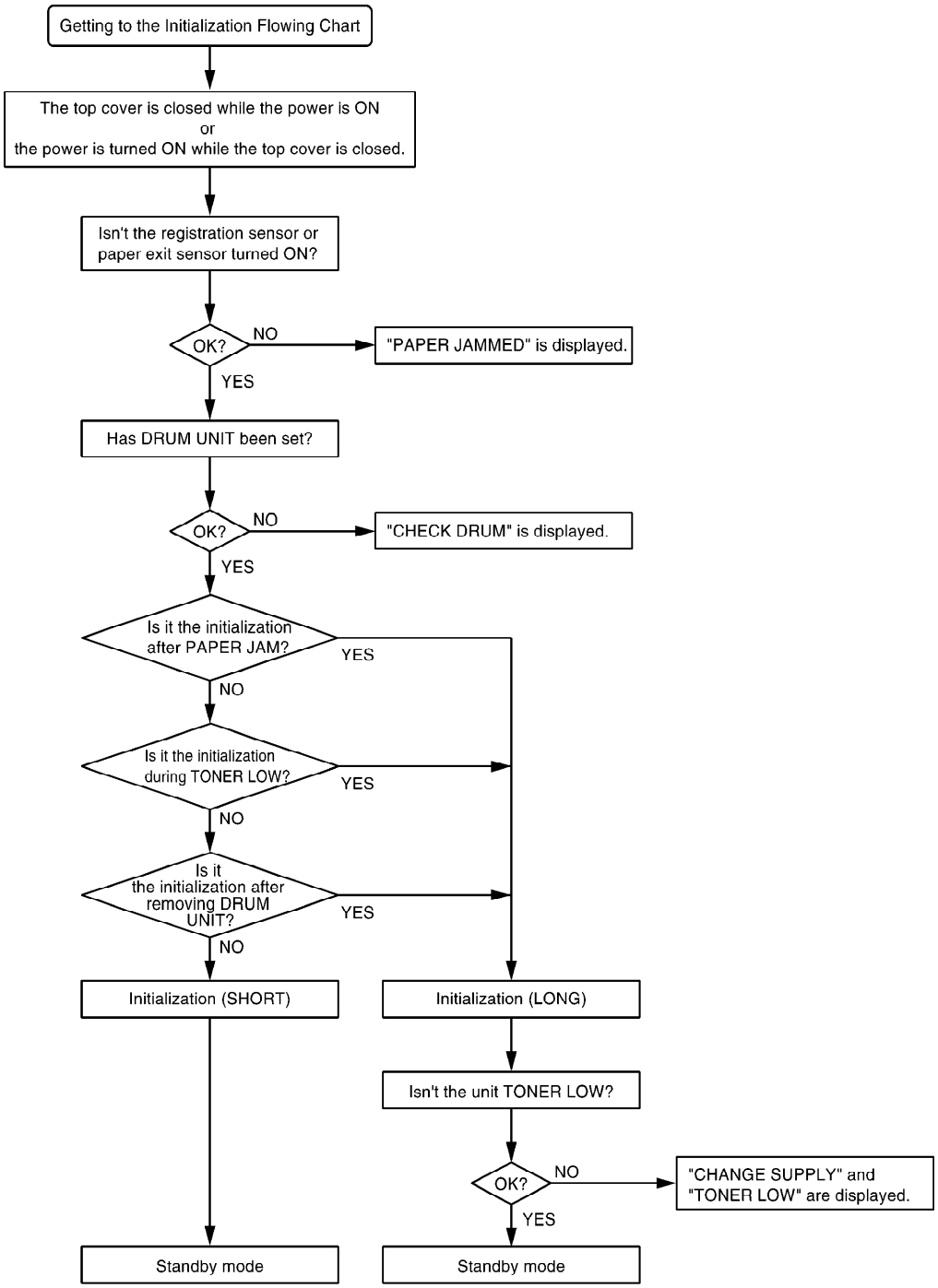
Determine the symptom and the troubleshooting method.



CROSS REFERENCE:
USER RECOVERABLE ERRORS()
SIMPLE CHECK LIST()
DIGITAL BOARD SECTION()
POWER SUPPLY BOARD SECTION()

6.5.3. INITIALIZATION

There are two types of initialization, one is the short initialization (about 3 seconds) and the other is the long initialization (about 10 seconds). The short initialization makes the unit enter the standby mode. The long initialization makes the unit enter the standby mode after cleaning or detecting the rest of toner.



6.5.4. SIMPLE CHECK LIST

SERIAL NO. _____ DATE _____

FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation	Copy by ADF	OK / NG	
Telephone operation	Handset transceiver/ receiver	OK / NG	
	MONITOR sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
Operation panel	Key check	OK / NG	Service code 561※
	LED check	OK / NG	Service code 557※
	LCD check	OK / NG	Service code 558※
Sensor	Sensor check	OK / NG	Service code 815※
Clock		OK / NG	Is the time kept correctly? Check with another clock.※
EXT-TAM	Handset transceiver/receiver	OK / NG	
	Remote control	OK / NG	

Note:
Check according to the service code referring to TEST FUNCTIONS ()

6.5.5. SIMPLIFIED TROUBLESHOOTING GUIDE

6.5.5.1. PRINTING

No.	Symptom	Cause	Countermeasure
1	GHOST IMAGE ()	Failed drum unit	Replace drum unit
		Failed transfer unit	Check the transfer roller and spring
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Failed fuser unit	Check the heat roller and the pressur roller and the spring and the heat lam thermistor
		Failed the power supply board	Go to POWER SUPPLY BOARD SECT
		Too thick or too thin recording paper	Use the recording paper from 16lb to
2	DARK OR WHITE VERTICAL LINE ()	Dirty the cover glass or the reflecting mirror	Clean the cover glass and the reflecti
		Dust on the path of the laser beam	Clean the path of the laser beam
		Dust on the developer roller	Replace drum unit
		Failed the heat roller or the pressuizedr roller	Check the heat roller and the pressur
		Failed LSU	Go to LSU SECTION ()
3	DARK OR WHITE HORIZONTAL LINE ()	Failed drum unit	Replace drum unit
		Failed the gear	Check the gear
		Failed the engine motor	Go to ENGINE MOTOR ()
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Scratch on the OPC drum	Replace drum unit
		Static electricity on the documents (when copying)	Check the connection between the pa around CIS and earth
4	DIRTY OR HALF DARKNESS BACKGROUND ()	Failed drum unit	Replace drum unit
		Life of drum unit is over	Replace drum unit
		Dirty the pickup roller and the regist roller and the feed roller and the eject roller and the heat roller and the pressure roller	Clean the pickup roller and the regist and the feed roller and the eject rolle heat roller and the pressure roller
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Dirty the recording paper path	Clean the recording paper path
5	BLACK PRINT ()	Failed drum unit	Replace drum unit
		Failed LSU	Go to LSU SECTION ()
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Failed the digital board	Check the digital board
		Failed CIS (when copying)	Go to CIS (Contact Image Sensor) SE

No.	Symptom	Cause	Countermeasure
6	LIGHT PRINT ()	Short toner	Supply toner
		Failed drum unit	Replace drum unit
		Life of drum unit is over	Replace drum unit
		Dirty the cover glass or the reflecting mirror	Clean the cover glass and the reflecti
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
7	BLACK DENSITY IS LIGHT OR UNEVEN()	Short toner	Supply toner
		Failed drum unit	Replace drum unit
		Life of drum unit is over	Replace drum unit
		Dirty the cover glass or the reflecting mirror	Clean the cover glass and the reflecti
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
8	BLANK PRINT ()	Failed drum unit	Replace drum unit
		Failed LSU	Go to LSU SECTION ()
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Failed the digital board	Check the digital board
		Failed CIS (when copying)	Go to CIS (Contact Image Sensor) SE
9	BLACK OR WHITE POINT ()	Failed the developer roller (31.4mm pitch)	Replace drum unit
		Failed the OPC drum (75.4mm pitch)	Replace drum unit
		Failed the heat roller (62.8mm pitch)	Check the heat roller
		Failed the charge blush (21mm pitch)	Replace drum unit
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()
		Too thick or too thin recording paper	Use the recording paper from 16lb to

6.5.5.2. RECORDING PAPER FEED

No.	Symptom	Cause	Countermeasure
1	MULTIPLE FEED ()	Dirty or failed the pickup roller	Clean or replace the pickup roller
		Dirty or failed the pickup rubber	Clean or replace the separation rubb
2	THE RECORDING PAPER IS WAVED OR WRINKLED ()	Dirty the pressure roller or the heat roller	Clean the pressure roller and the hea
		Failed the spring of pressure roller	Replace the spring of pressure roller
		Too thin recording paper	Use the recording paper from 16lb to
3	SKEW ()	Dirty or failed the pickup roller	Clean or replace the pickup roller
		Dirty or failed the pickup rubber	Clean or replace the separation rubb
		Dirty or failed the paper feed roller	Clean or replace the regist roller
		Dust on the recording paper path	Clean the recording paper path
		Failed LSU	Replace LSU
		Over the max capacity of the recording paper	Set up to MAX 150 sheets
		Too thick or too thin recording paper	Use the recording paper from 16lb to
4	THE RECORDING PAPER DOES NOT FEED ()	Dirty or failed the pickup roller	Clean or replace the pickup roller
		Dirty or failed the pickup rubber	Clean or replace the separation rubb
		Failed the gear	Check the gear
		Failed the engine motor	Go to ENGINE MOTOR ()
		Failed the paper feed sensor lever	Check the regist sensor (paper top se lever
		Failed the paper feed sensor	-----
5	THE RECORDING PAPER JAM()" PAPER JAMMED" ON THE LCD	Dirty or failed the pressure roller	Clean or replace the pressure roller
		Dirty or failed the heat roller	Clean or replace the heat roller
		Dust on the recording paper path	Clean the recording paper path
		Failed the paper feed roller	Replace the regist roller
		Failed the gear	Check the gear
		Failed the engine motor	Go to ENGINE MOTOR ()
		Failed the paper feed sensor lever	Check the regist sensor (paper top se lever
		Failed the paper feed sensor	-----
		Failed the exit sensor lever	Check the exit sensor lever
		Failed the exit sensor	Go to PAPER EXIT SENSOR..... "PAP JAMMED" ()
		Too thick or too thin recording paper	Use the recording paper from 16lb to
		Not set the toner bottle	Set toner bottle
6	BACK SIDE OF THE RECORDING PAPER IS DIRTY()	Dirty the recording paper path	Clean the recording paper path
		Dirty the pressure roller	Clean the pressure roller
		Dirty the regist roller	Clean the regist roller
		Failed the high-voltage terminal	Check the high-voltage terminal
		Failed the high voltage power supply board	Go to HIGH VOLTAGE SECTION ()

6.5.5.3. COPY AND FAX

No.	Symptom	Cause	Countermeasure
1	NO DOCUMENT FEED (NO DOCUMENT FEED,DOCUMENT JAM and MULTIPLE DOCUMENT FEED.) ()	Failed the document sensor lever	Replace the document sensor lever
		Failed the document sensor	Go to DOCUMENT SENSOR (P.161)
		Dirty or failed the separation roller	Clean or replace the separation roller
		Dirty or failed the separation rubber	Clean or replace the separation rubb
		Failed the separation spring	Replace the separation spring
	DOCUMENT JAM (NO DOCUMENT FEED,DOCUMENT JAM and MULTIPLE DOCUMENT FEED.) ()	Dust or scratch on the document paper path	Clean the document paper path
		Failed the gear	Check the gear
		Failed the ADF motor	Go to ADF MOTOR ()
		Failed the ADF cover open switch lever	Replace the ADF cover open switch l
	MULTIPLE DOCUMENT FEED (NO DOCUMENT FEED,DOCUMENT JAM and MULTIPLE DOCUMENT FEED.) ()	Dirty or failed the separation roller	Clean or replace the separation roller
		Dirty or failed the separation rubber	Clean or replace the separation rubb
		Failed the separation spring	Replace the separation spring
2	SKEW (ADF) ()	Dust or scratch on the document paper path	Clean the document paper path
		Failed the document feed roller	Replace the document feed roller
		Failed the document guide	Replace the document guide
3	THE SENT FAX DATA IS SKEWED ()	The cause of ADF	Go to SKEW (ADF)()
		The cause of scanner glass	----
		Problem with the other FAX machine	
4	THE RECEIVED FAX DATA IS SKEWED ()	The cause of printing	Go to SKEW (ADF)()
		Problem with the other FAX machine	
5	THE RECEIVED OR COPIED DATA IS EXPANDED ()	Dirty or failed the drive roller (at ADF)	Clean or replace the drive roller
		Dirty or failed the document feed roller (at ADF)	Clean or replace the document feed r
		Dirty or failed the separation roller (at ADF)	Clean or replace the separation roller
		Failed CIS movement (at SG)	Replace the belt or the gear or the sh ADF motor
6	BLACK OR WHITE VERTICAL LINE IS COPIED ()	Dirty or failed the white plate (2 places)	Clean or replace the white plate
		Dirty or failed the glass board	Clean or replace the glass board
		The cause of printing	Go to DARK OR WHITE VERTICAL LI
		Failed CIS	Go to CIS (Contact Image Sensor) SE

No.	Symptom	Cause	Countermeasure
7	AN ABNORMAL IMAGE IS COPIED ()	Dirty or failed the white plate (2 places)	Clean or replace the white plate
		Dirty or failed the glass board	Clean or replace the glass board
		Dirty or failed the drive roller (at ADF)	Clean or replace the drive roller
		Dirty or failed the document feed roller (at ADF)	Clean or replace the document feed r
		Dirty or failed the separation roller (at ADF)	Clean or replace the separation roller
		Failed CIS movement (at SG)	Replace the belt or the gear or the sh ADF motor
		Failed CIS	Go to CIS (Contact Image Sensor) SE
		The cause of printing	Go to DARK OR WHITE VERTICAL LI

6.5.5.4. Others

No.	Symptom	Cause	Countermeasure
1	Cannot print legal size	Not selected the legal mode	Select the legal mode in the user programming mode
2	'CHECK DRUM' on the LCD	The drum unit can not be detected. -Drum Sensor trouble -Mechanical shutter trouble	Go to DRUM SENSOR () Go to LSU (Laser Scanning Unit) SEC
3	'CHANGE DRUM' on the LCD	The toner sensor cannot detect the toner sensor signal.	Go to TONER SENSOR.... “TONER EM “TONER LOW”, “CHANGE DRUM” ()
4	'OUT OF PAPER' on the LCD	Failed the paper sensor lever	Replace the paper sensor lever
		Failed the paper sensor	Go to PAPER SENSOR..... “OUT OF P
5	'COVER OPEN' on the LCD	Failed the top cover open switch lever	Replace the top cover open switch le
		Failed the top cover open switch	Go to TOP COVER OPEN SWITCH ()
6	CALL SERVICE 1' on the LCD	The polygon motor of LSU is unusually	Check the connector and LSU and th board
7	CALL SERVICE 2' on the LCD	The laser of LSU is unusually	Check the connector and LSU and th board
8	CALL SERVICE 3' on the LCD	The fuser temperature is unusually	Check the connector and the fuser ar thermistor and the digital board
9	CALL SERVICE 4' on the LCD	The fan motor is unusually	Check the connector and the fan mot the digital board

6.5.6. CALL SERVICE TROUBLESHOOTING GUIDE

Call Service related error is most frequent.
Call Service 1 ----- Polygon doesn’t rotate..... Refer to LSU (Laser Scanning Unit) SECTION ().

- First, listen to the sound. If rotation sound isn't heard, check 24V line, POLON signal and POLCLK signal. If even a little of sound is

heard, check XREADY signal.

Call Service 2 ----- Laser isn't output..... Refer to LSU (Laser Scanning Unit) SECTION ()

- This can be judged only by referring to signal. Check 5V line, XHSYNC, SPC, VIDEO, LDON.

Call Service 3 ----- Detection of fixing temperature..... Refer to HEAT LAMP CONTROL CIRCUIT ()

- *Service mode *655 tells the detection number and 3 latest temperatures of the thermistor. The detection point of the Call Service 3 and the thermistor temperature is displayed. Maximum 3 latest temperatures are displayed showing the newest on the left. [AABB CCDD EEFF] AA, CC and EE show the detection points and BB, DD and FF show their temperature detection points.
  0: means that CALL SERVICE 3 has not been appeared.
  1: means that it did not reach 56°C within 22 seconds since the heater was turned ON.
  3: means that it did not reach the secondary stabilizing temperature (160°C) within 35 seconds from 56°C.
  4: means that it became T2-40deg (120°C or below) after T2; the secondary stabilizing temperature (160°C). (The heater has burnt out.)
  5: means that it became over 220°C.
  6: means that during printing the SHORT of the thermistor (AD: 01h or below) was detected.
  7: means that the thermistor's SHORT (AD:00h) and OPEN (AD: F9h or over) were detected.

Call Service 4 ----- Rotation of Fan..... Refer to FAN MOTOR SECTION ()

- Connector isn't inserted firmly, dust is caught in and the fan is broken.
  * As for Call Services 1, 2 and 4, turn the power OFF then ON to restart.

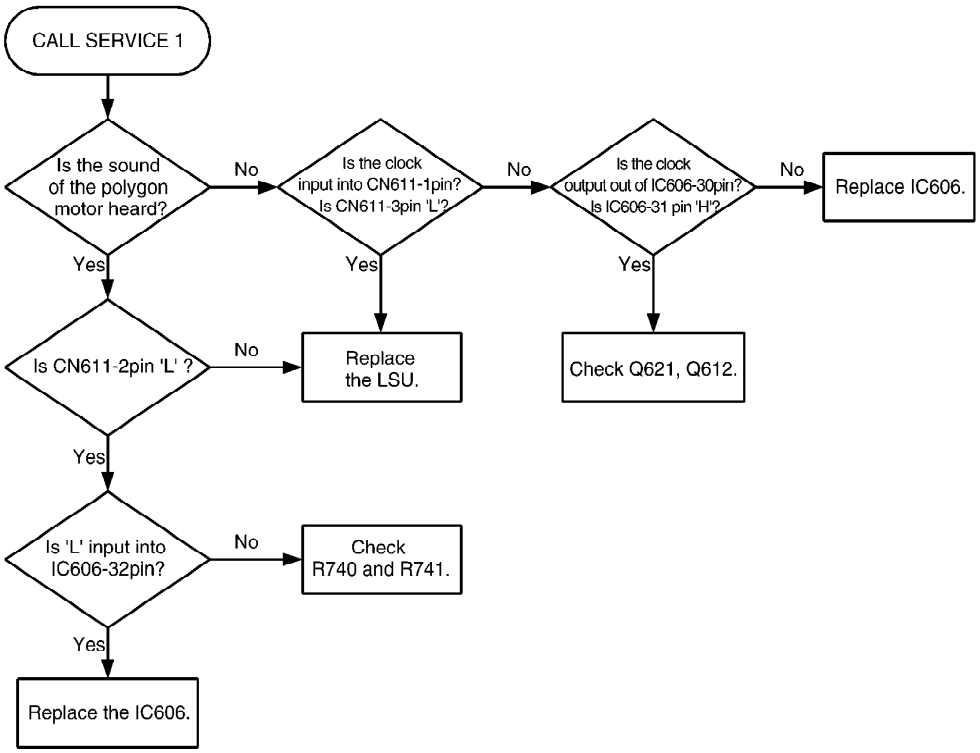
<Note>

Once "CALL SERVICE3" is displayed, the unit does not disappear until the Factory Setup or Servi Function #529 is executed. Therefore Service Function #529 should be executed before the confirmation, and #529 should be the countermeasure.

6.5.6.1. CALL SERVICE 1

"CALL SERVICE 1" means that the polygon motor inside the LSU does not rotate.
The rotation of the polygon motor is detected by IC606-32pin (XREADY).

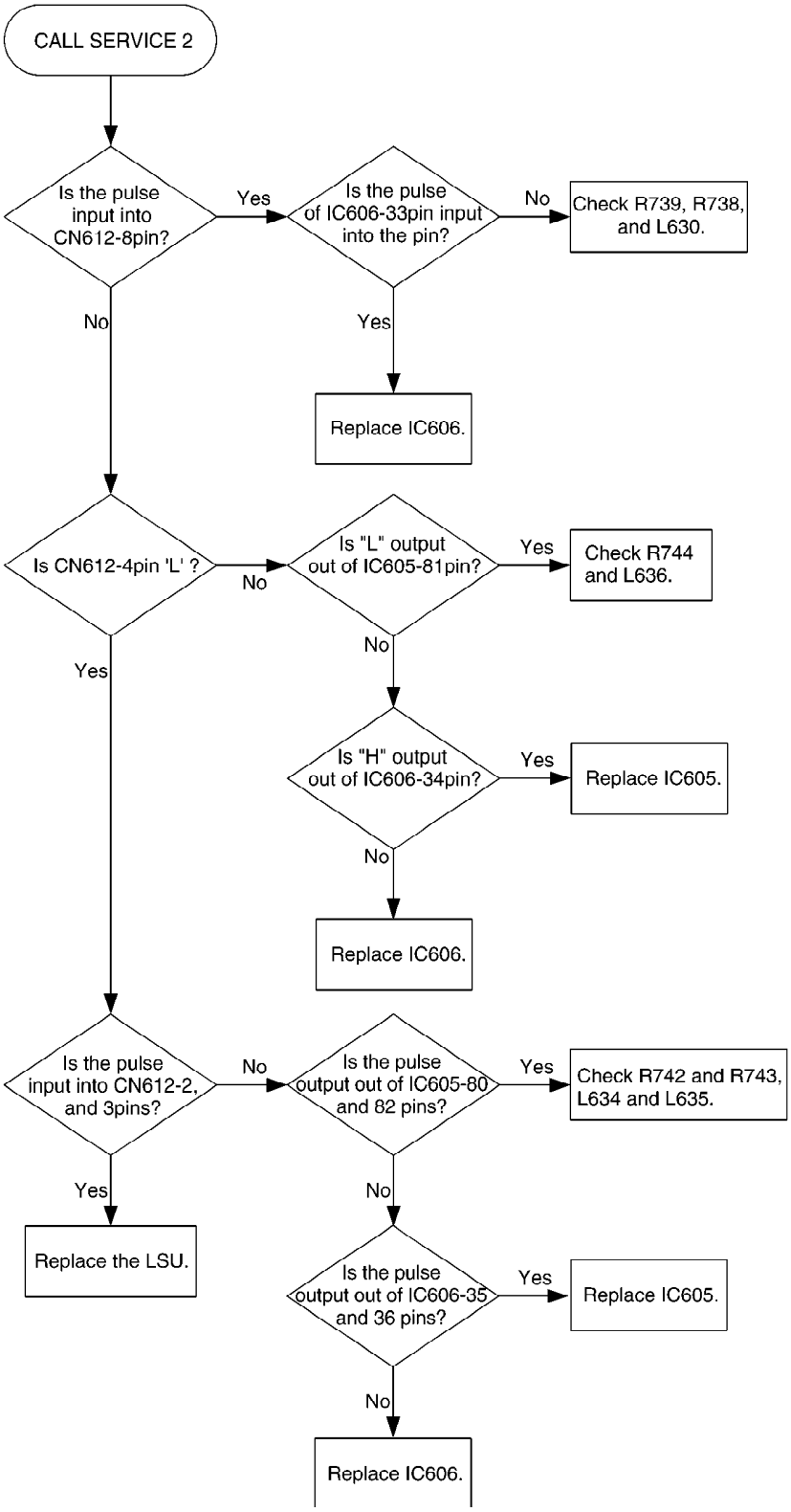
After the LCD indicates "CALL SERVICE 1 ", turn the power OFF/ON.
Then, when the unit starts initial operation, confirm that the rotating sound of the polygon motor is heard before the engine motor starts to run.



6.5.6.2. CALL SERVICE 2

"CALL SERVICE 2" means that the synchronous signal out of the LSU cannot be detected.
The synchronous signal out of the LSU is detected by IC 606-33pin. (XHSYNC)

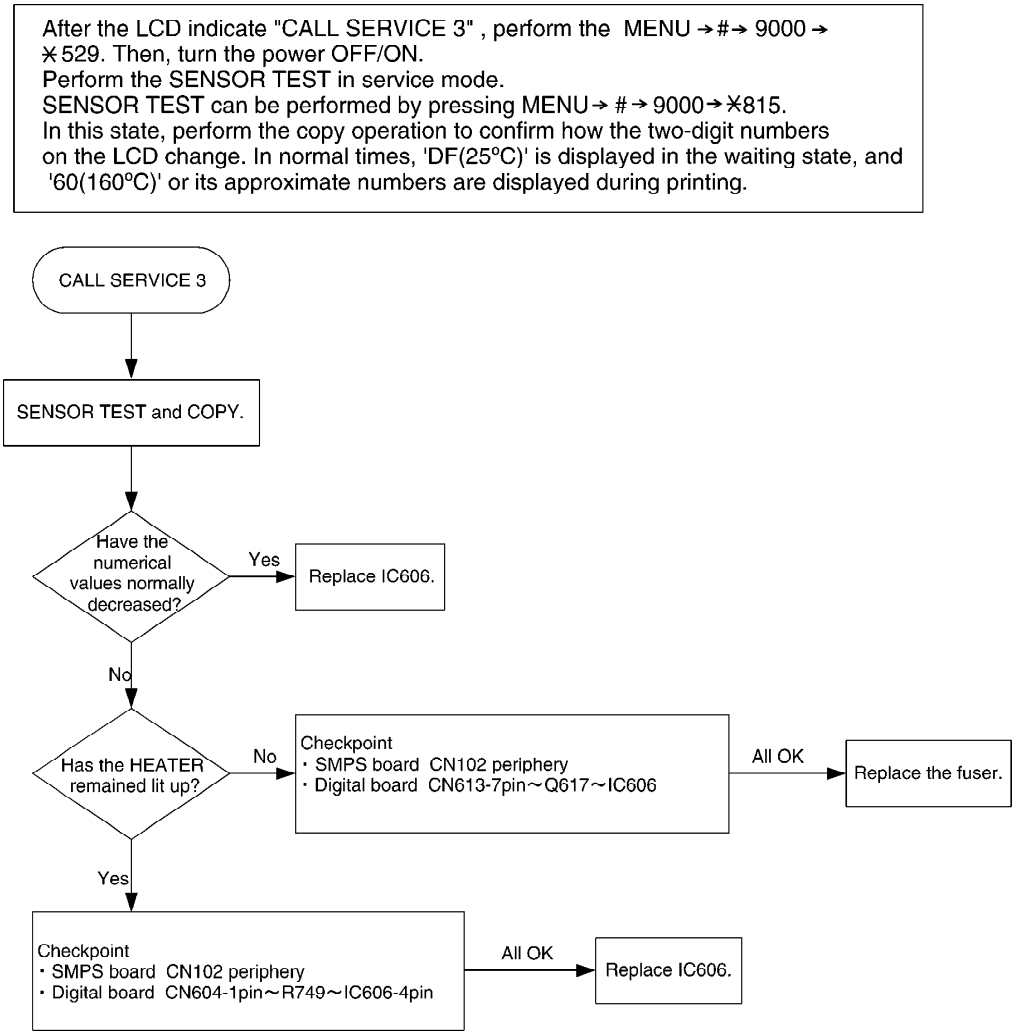
After the LCD indicates "CALL SERVICE 2 ", turn the power ON/OFF, then confirm the waveform when theunit starts initial operation.



Note:
As for the "Pulse" waveform of the above flow chart, see the timing chart.

6.5.6.3. CALL SERVICE 3

"CALL SERVICE 3" means that the temperature of the fuser does not rise up to or exceed a constant temperature.
The temperature is monitored with the thermistor inside the fuser and detected with the voltage input into IC 606-4pin.

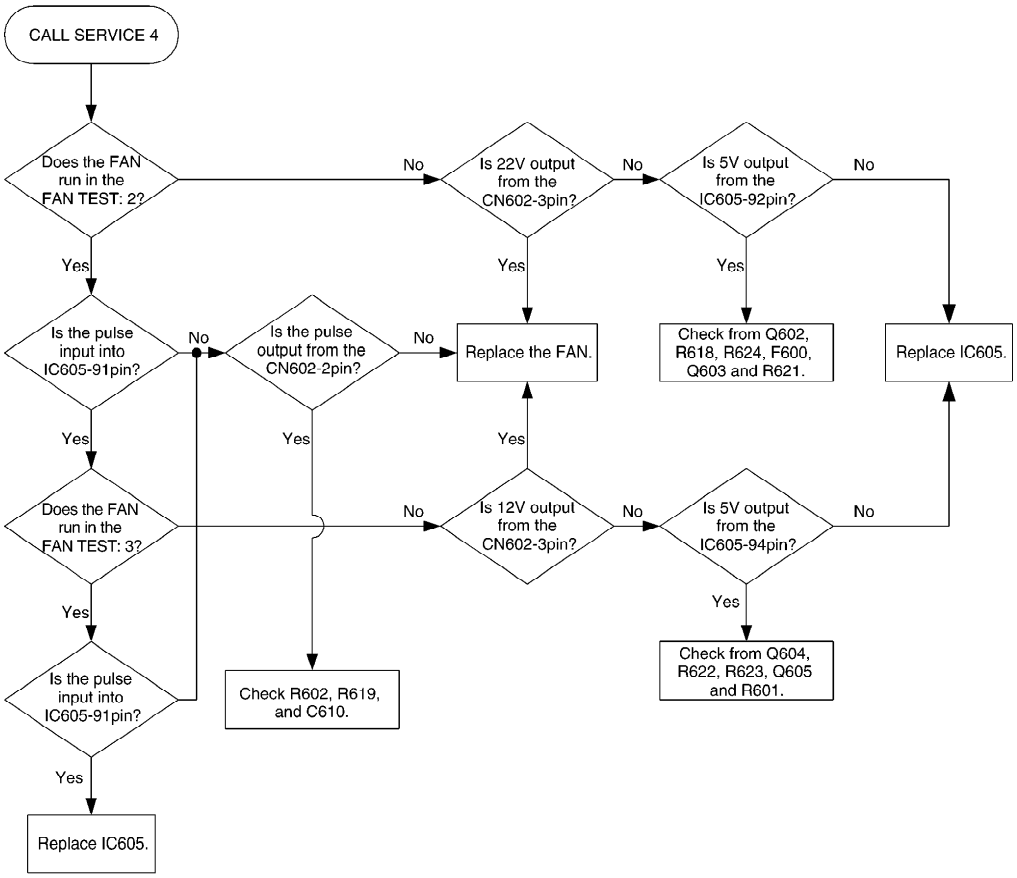


***When Call Service 3 is occurred, the cause can be distinguished.**
Refer to page 80 for details.

6.5.6.4. CALL SERVICE 4

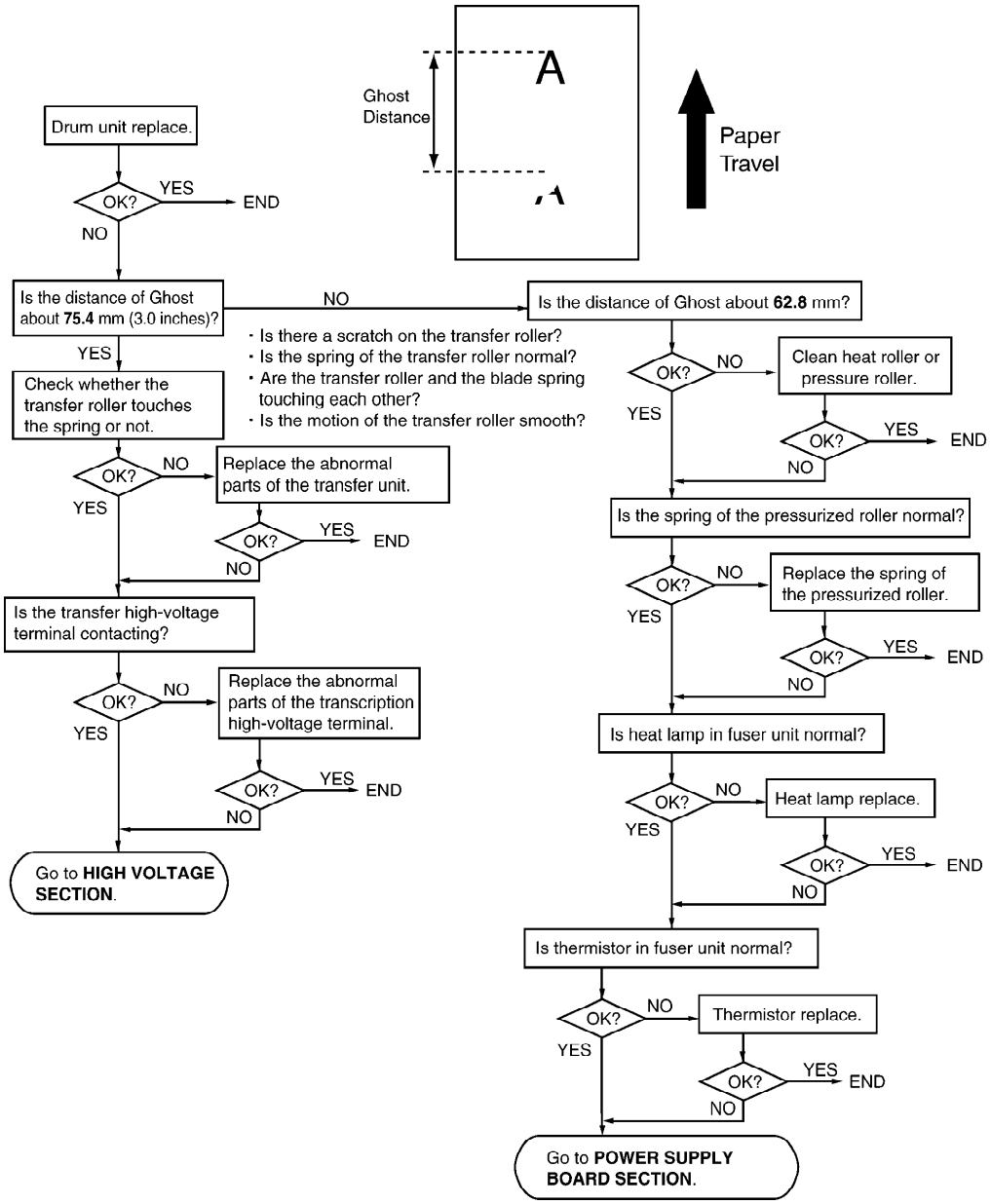
"CALL SERVICE 4" means that the FAN does not run or the running of the FAN cannot be detected normally.
The running of the FAN is detected by IC 605-91pin. "CALL SERVICE 4" is displayed when it detects NG five times continuously.
After repairing, copy five times.If “CALL SERVICE 4 “ is displayed,check again.

After the LCD indicates "CALL SERVICE 4 " , turn the power OFF/ON.
Then, perform the FAN TEST in service mode.
This can be performed by pressing MENU→#→9000→✳677.
1: OFF (Default)
2: ON (High Speed)
3: ON (Low Speed)



6.5.7. PRINT

6.5.7.1. GHOST IMAGE

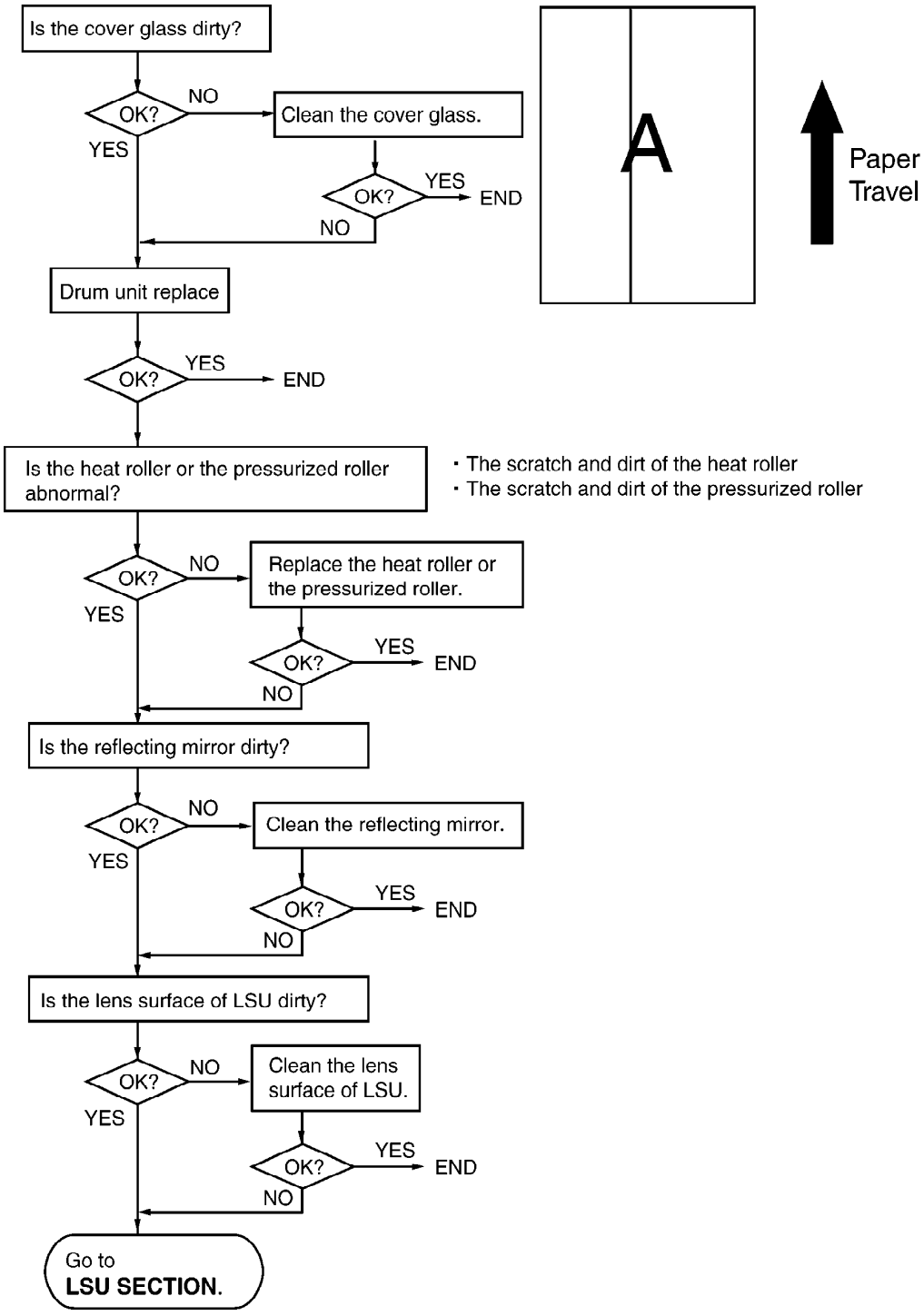


CROSS REFERENCE:

HIGH VOLTAGE SECTION()

POWER SUPPLY BOARD SECTION()

6.5.7.2. DARK OR WHITE VERTICAL LINE



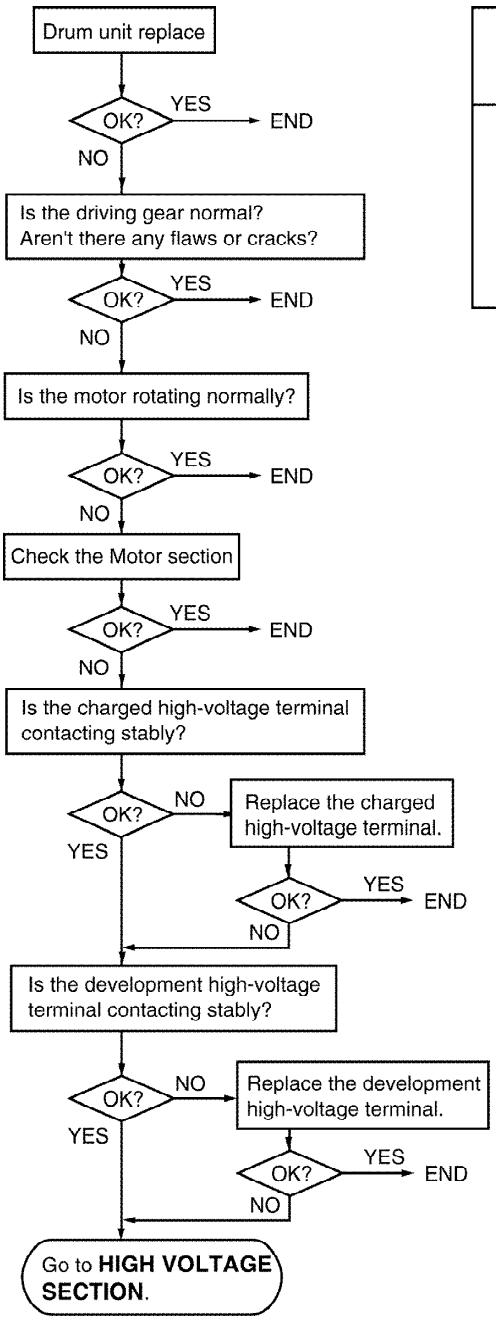
Note:

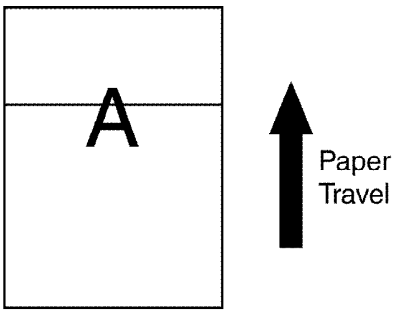
When wiping the cover glass, reflecting mirror and LSU lens, use a dry and soft cloth.

CROSS REFERENCE:

LSU SECTION ()

6.5.7.3. DARK OR WHITE HORIZONTAL LINE

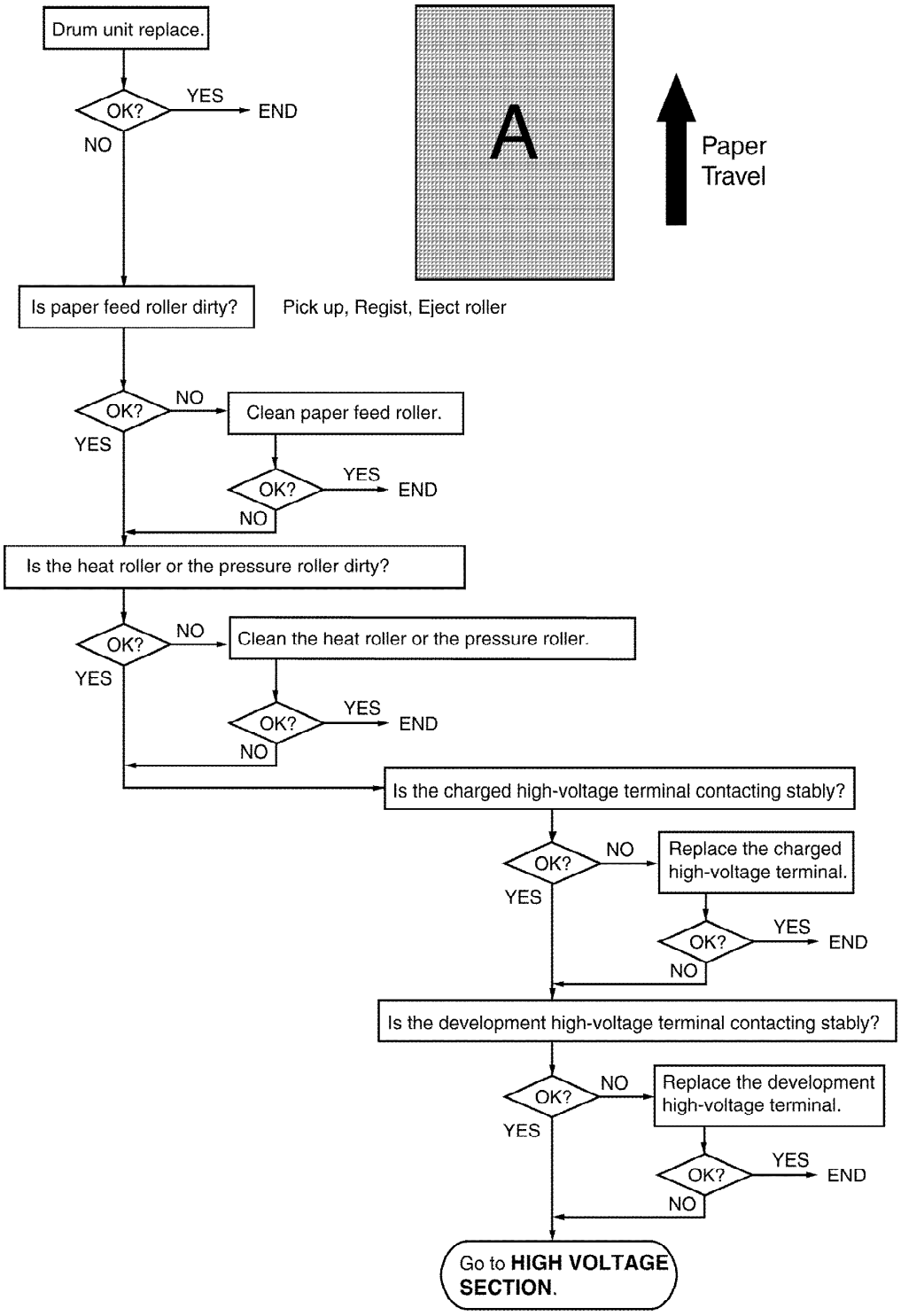




・It is necessary to describe the information about the lines that cannot be troubleshooted in such as halftone.
・When there is the information about the troubleshooted horizontal line, please add the description of it.

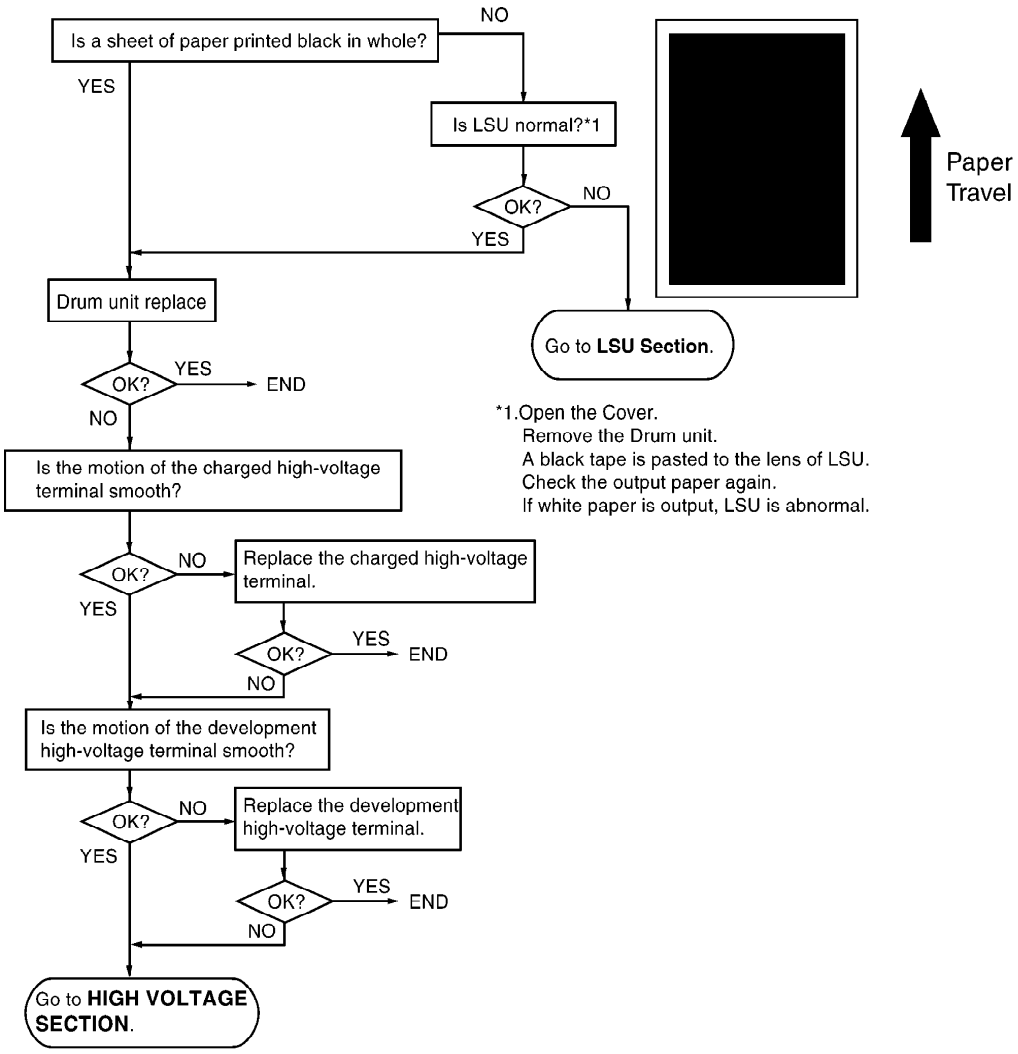
CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

6.5.7.4. DIRTY OR HALF DARKNESS BACKGROUND



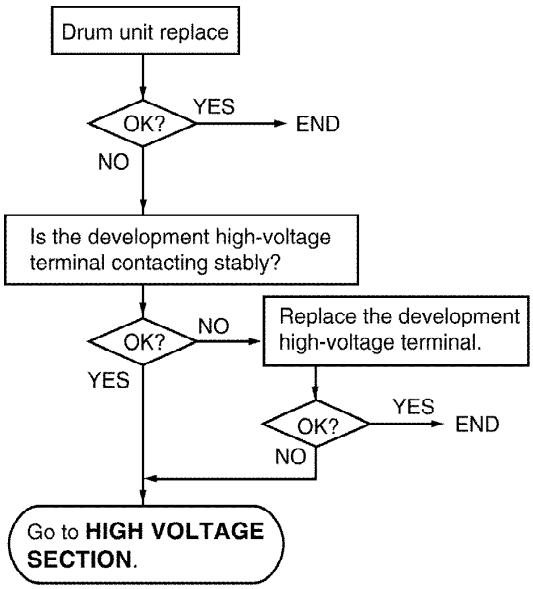
CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

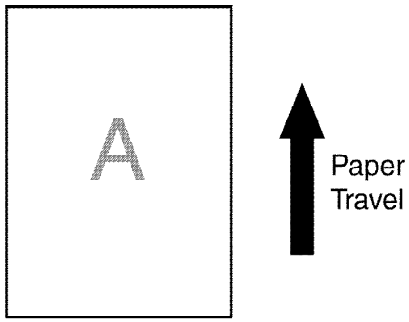
6.5.7.5. BLACK PRINT



CROSS REFERENCE:
HIGH VOLTAGE SECTION ()
LSU SECTION ()

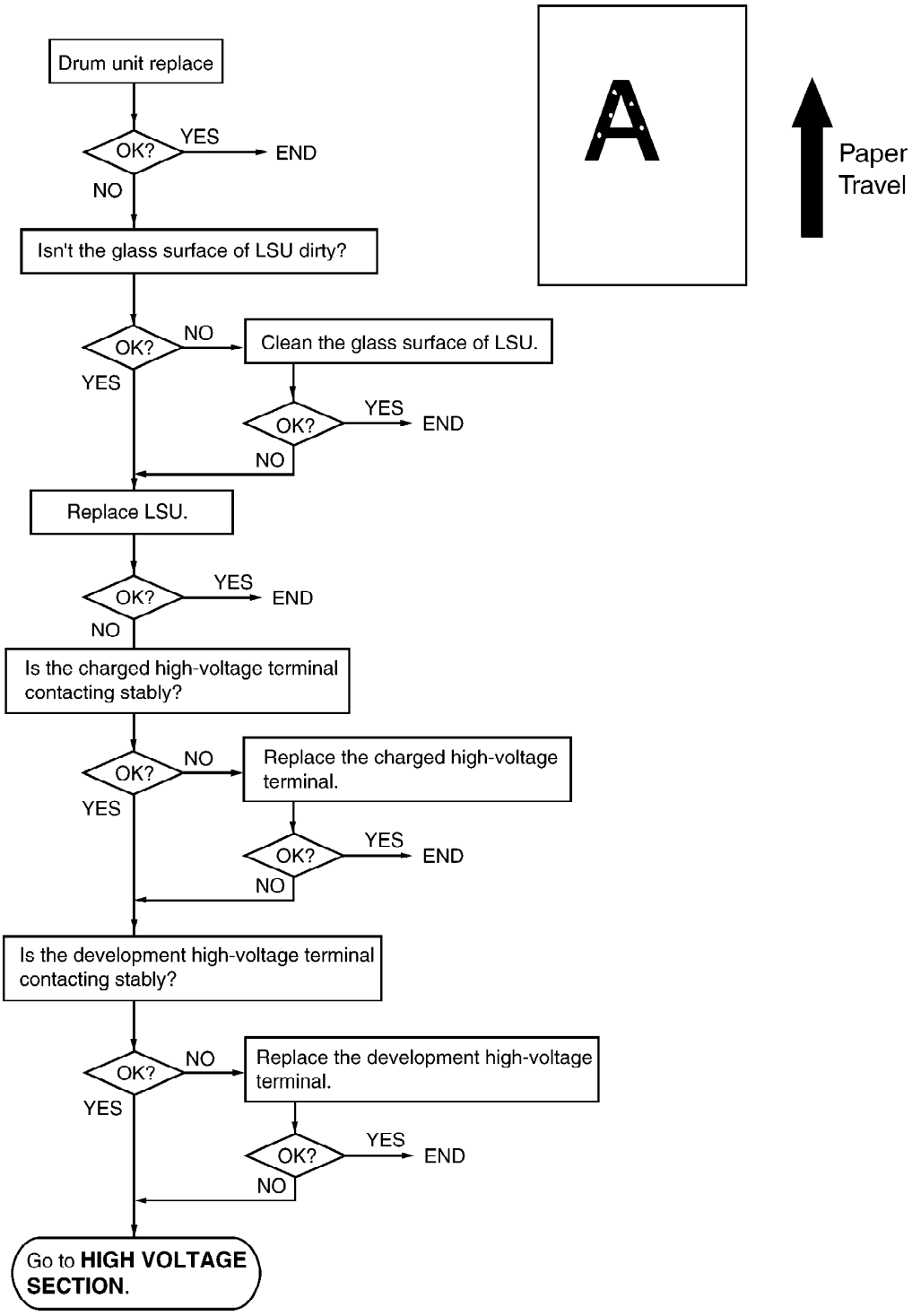
6.5.7.6. LIGHT PRINT





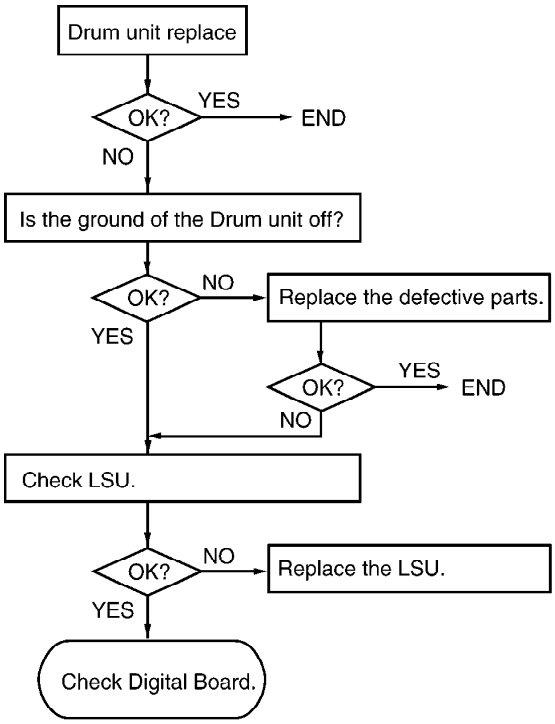
CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

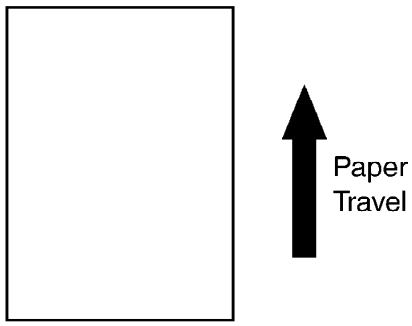
6.5.7.7. BLACK DENSITY IS LIGHT OR UNEVEN



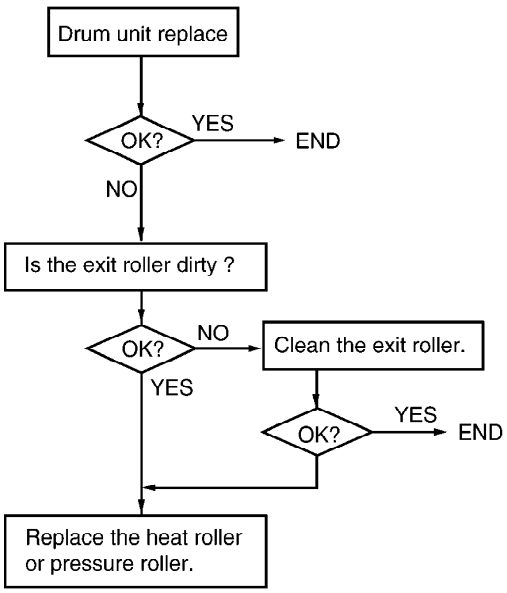
CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

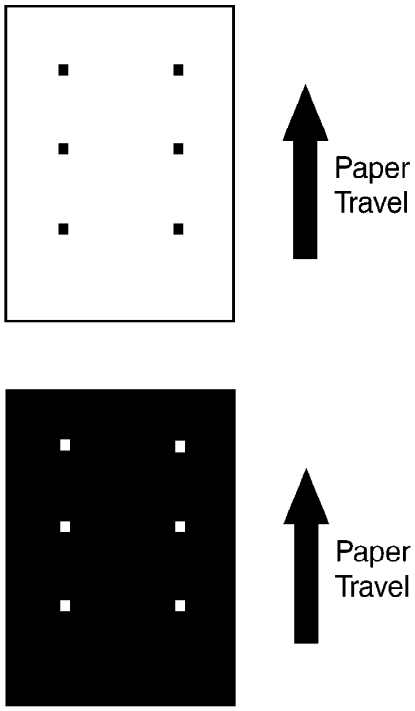
6.5.7.8. BLANK PRINT





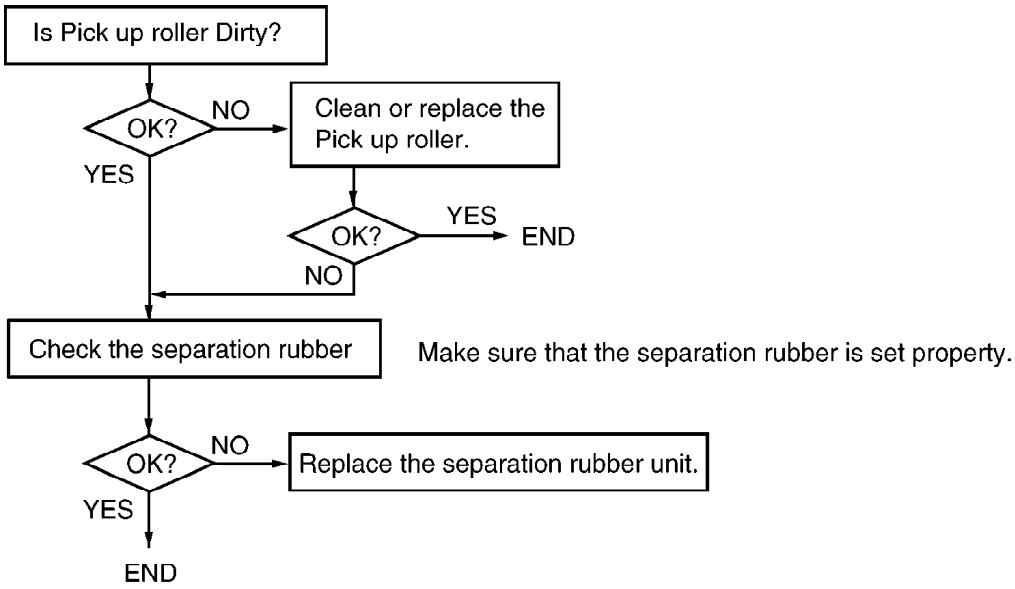
6.5.7.9. BLACK OR WHITE POINT



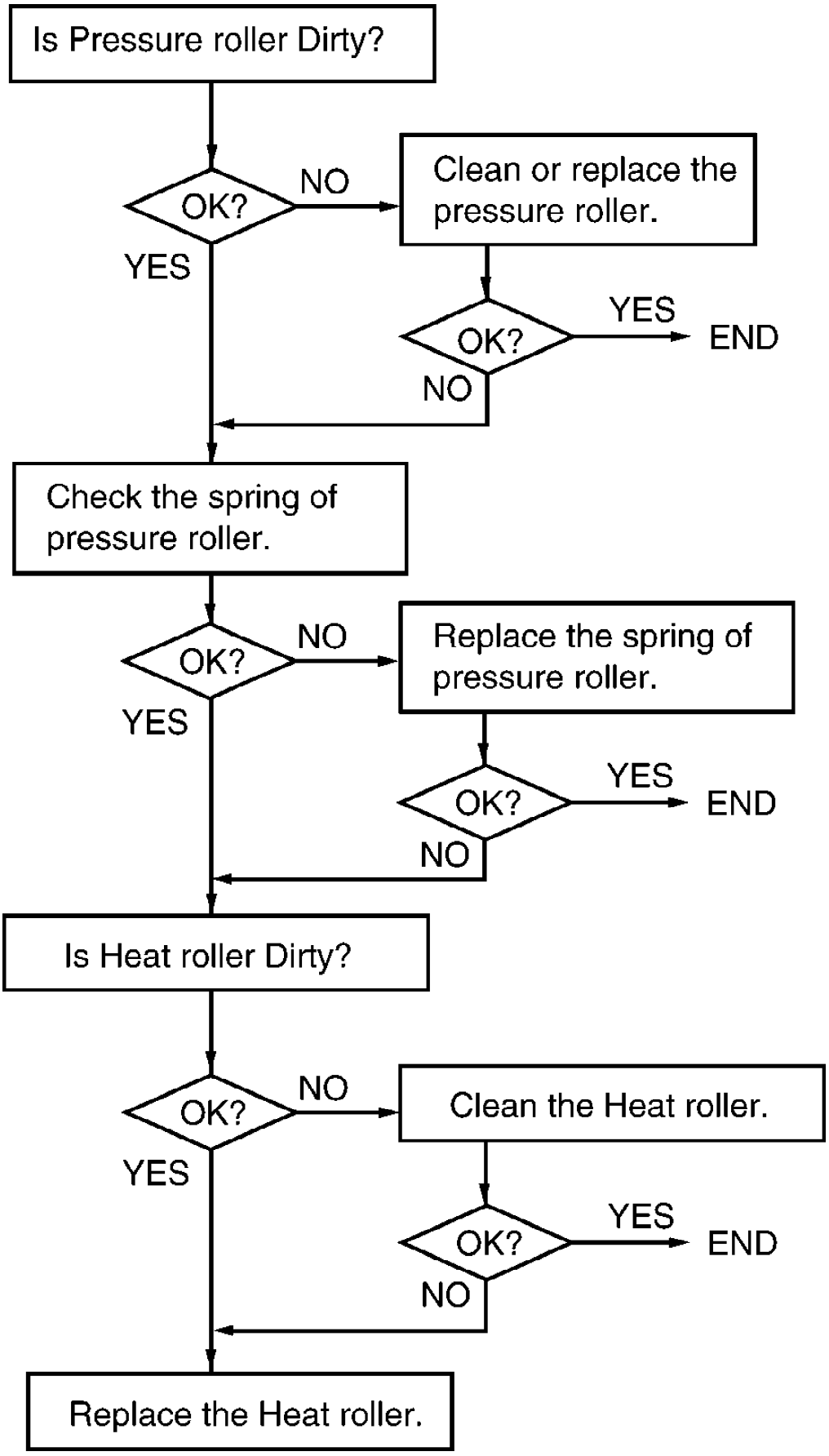


6.5.8. RECORDING PAPER FEED

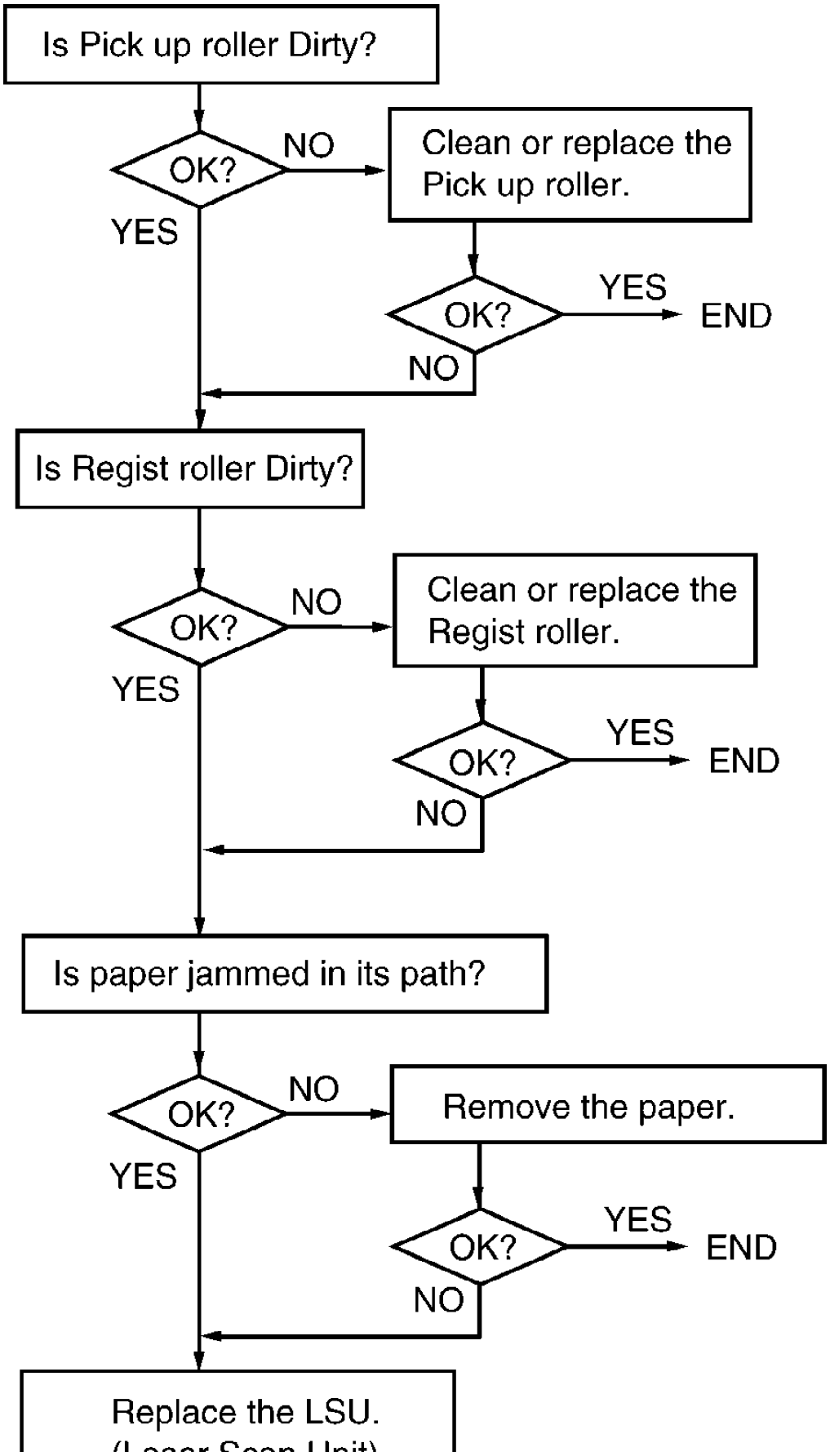
6.5.8.1. MULTIPLE FEED



6.5.8.2. THE RECORDING PAPER IS WAVED OR WRINKLED

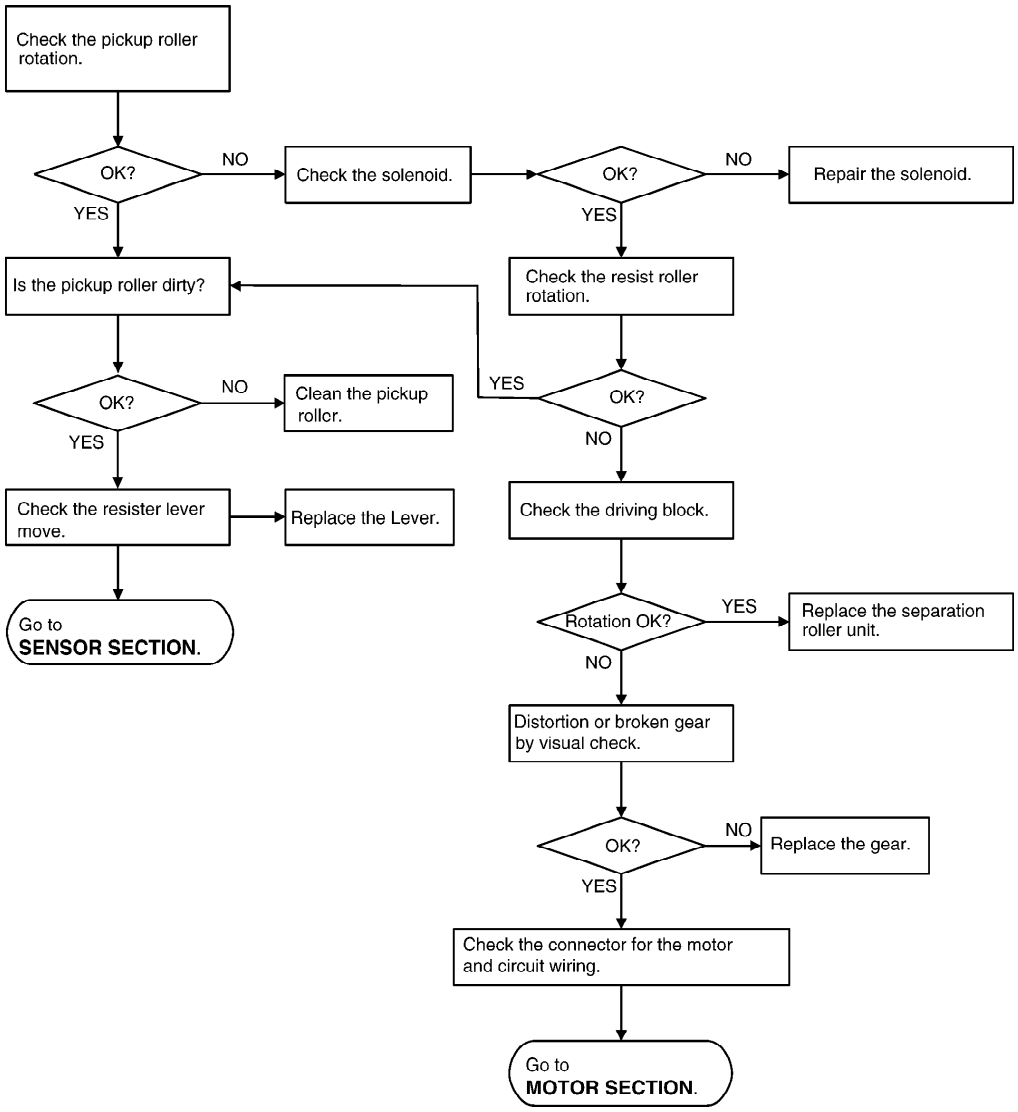

Is Pressure roller Dirty?
OK?
NO
Clean or replace the pressure roller.
YES
OK?
YES
END
NO
Check the spring of pressure roller.
OK?
NO
Replace the spring of pressure roller.
YES
OK?
YES
END
NO
Is Heat roller Dirty?
OK?
NO
Clean the Heat roller.
YES
OK?
YES
END
NO
Replace the Heat roller.

6.5.8.3. SKEW


Is Pick up roller Dirty?
OK?
NO
Clean or replace the Pick up roller.
YES
OK?
YES
END
NO
Is Regist roller Dirty?
OK?
NO
Clean or replace the Regist roller.
YES
OK?
YES
END
NO
Is paper jammed in its path?
OK?
NO
Remove the paper.
YES
OK?
YES
END
NO
Replace the LSU.

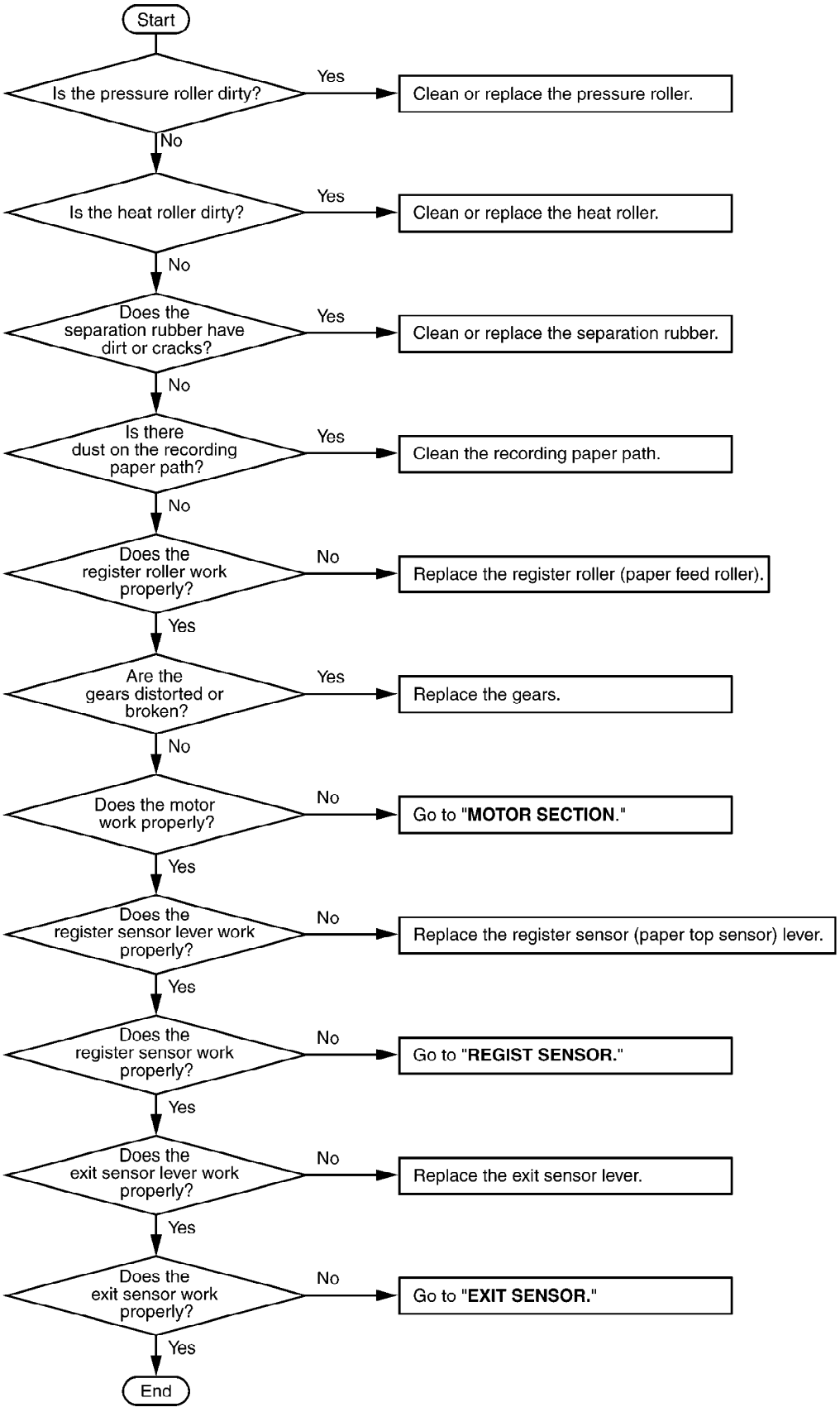
(Laser Scan Unit)

6.5.8.4. THE RECORDING PAPER DOES NOT FEED



CROSS REFERENCE:
SENSOR SECTION ()
MOTOR SECTION ()

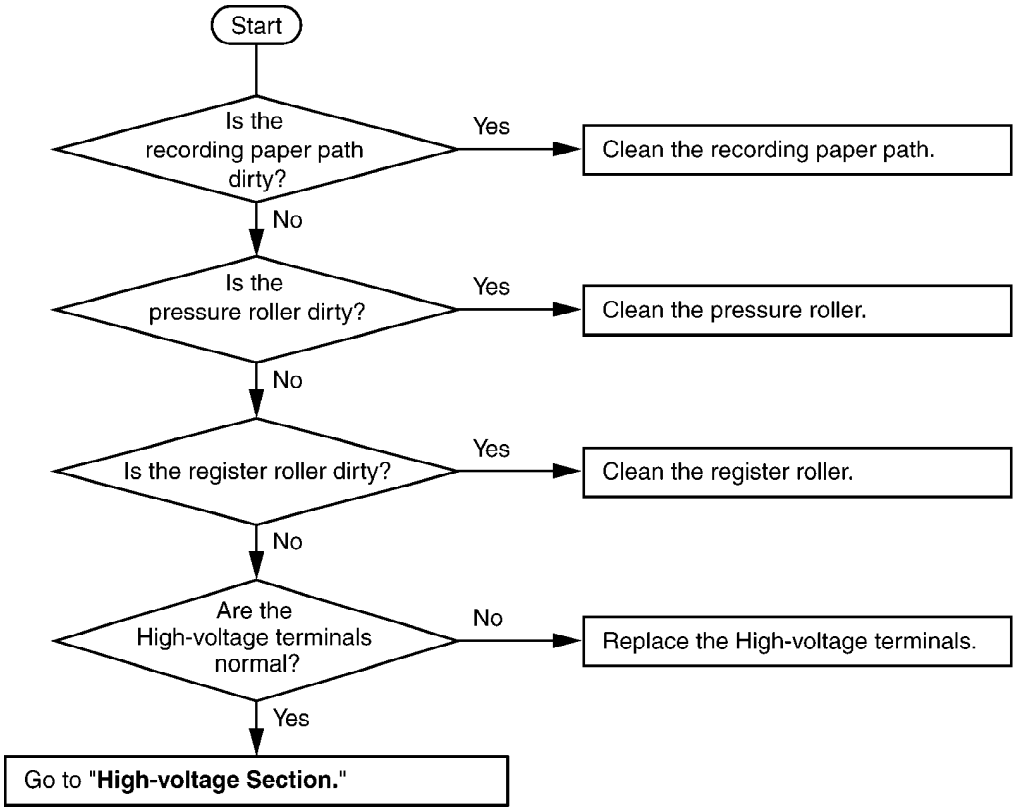
6.5.8.5. THE RECORDING PAPER JAM



CROSS REFERENCE:

PAPER EXIT SENSOR..... “PAPER JAMMED” ()
FAN MOTOR SECTION ()
REGIST SENSOR ()
When the recording paper jam is occurred, the service mode *630 distinguishes the cause.
0:No Paper Jam
1:Failed pick up
2:The paper top sensor is not turned OFF although the fixed time had passed since the sensor was turned ON.
3:The paper eject sensor is not turned ON although the fixed time had passed since the paper top sensor was turned ON.
4:The paper eject sensor is not turned OFF although the fixed time had passed since it was turned ON.
5:The register sensor (paper top sensor) or paper exit sensor was turned ON before the motor started to rotate.
6:The register sensor (paper top sensor) chattered.
7:The paper exit sensor chattered.

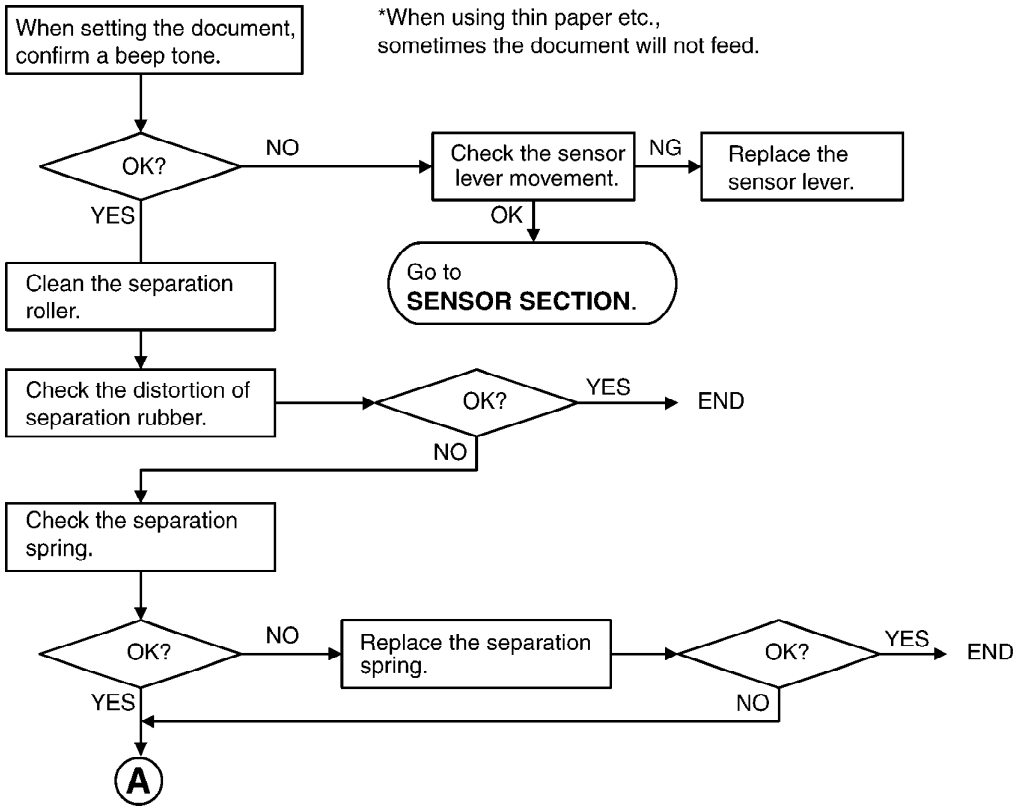
6.5.8.6. BACK SIDE OF THE RECORDING PAPER IS DIRTY



CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

6.5.9. ADF (Auto document feed) SECTION

6.5.9.1. NO DOCUMENT FEED,DOCUMENT JAM and MULTIPLE DOCUMENT FEED.



CROSS REFERENCE:

SENSOR SECTION ()

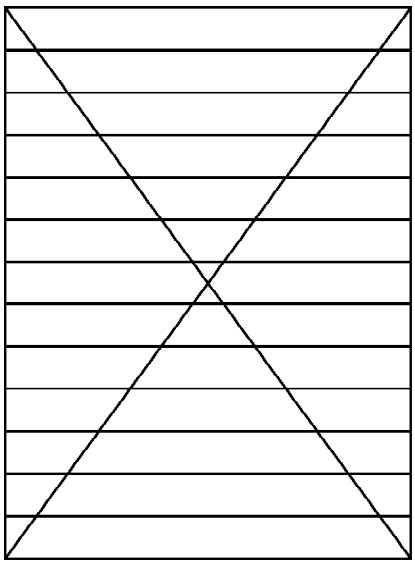
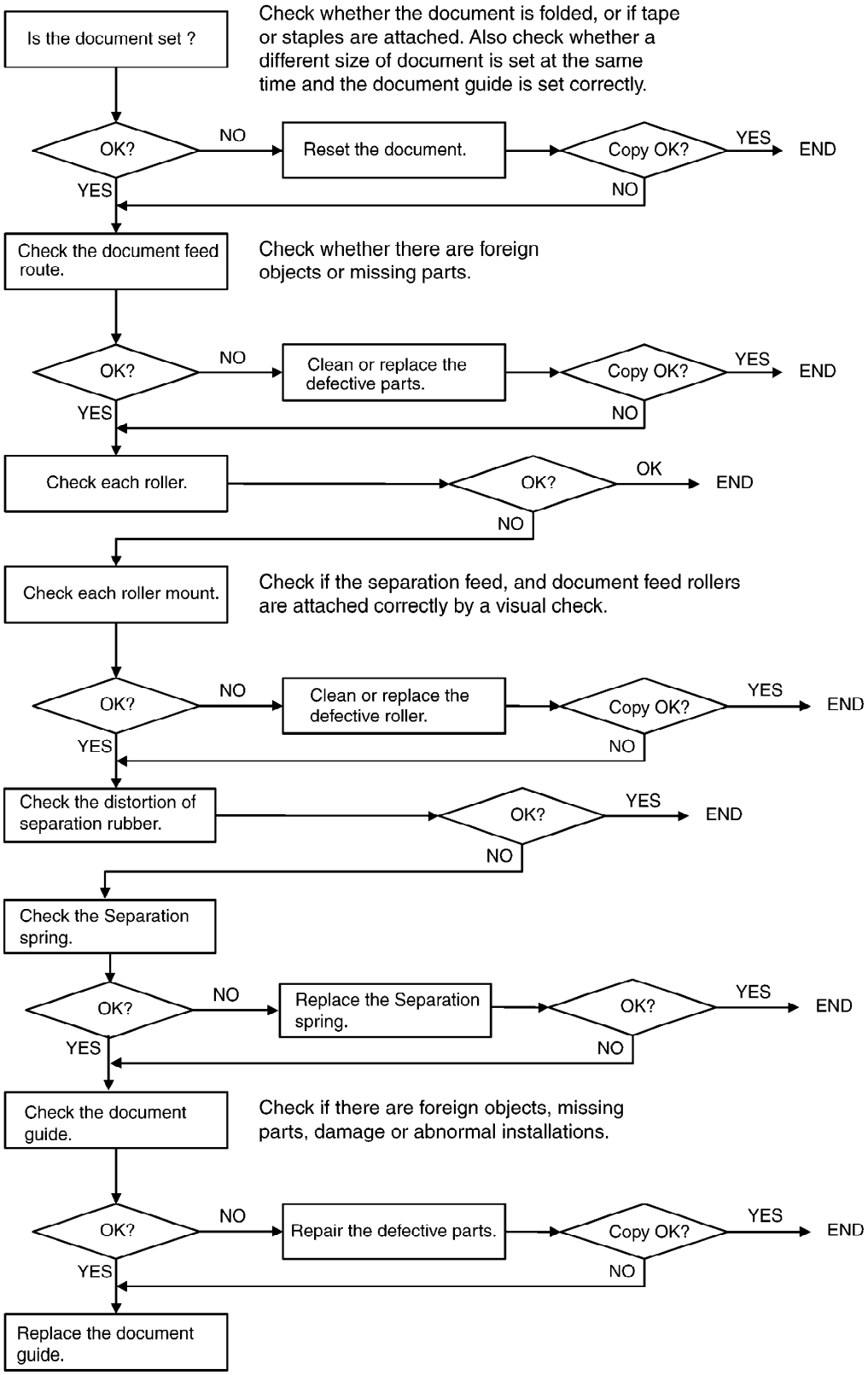


Fig. b

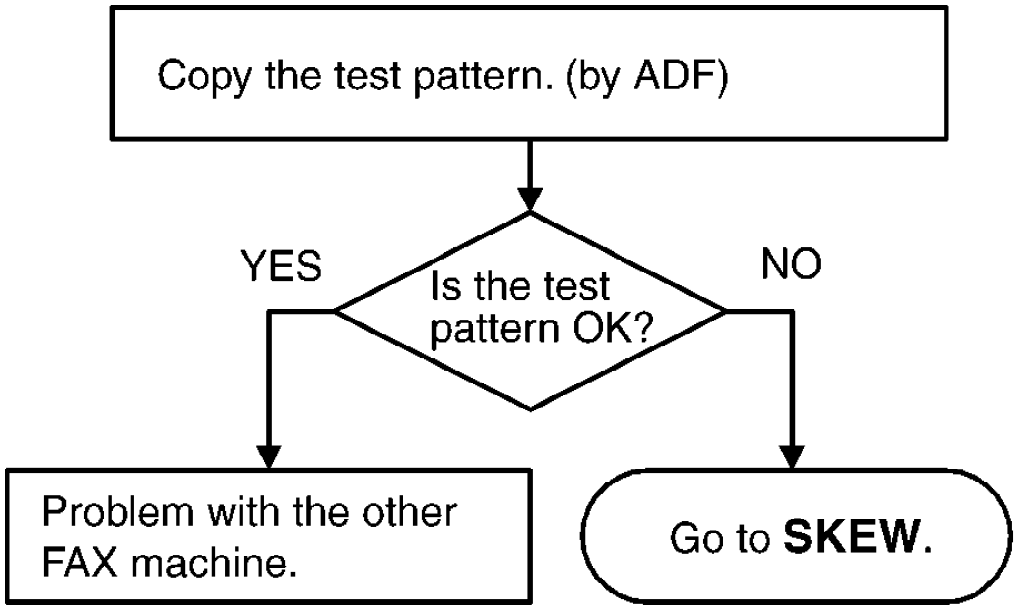
When confirming if the characters are extended or distorted on,if the feed problem occurs,use this test chart. (Fig b)

CROSS REFERENCE:
MOTOR SECTION ()

6.5.9.2. SKEW (ADF)

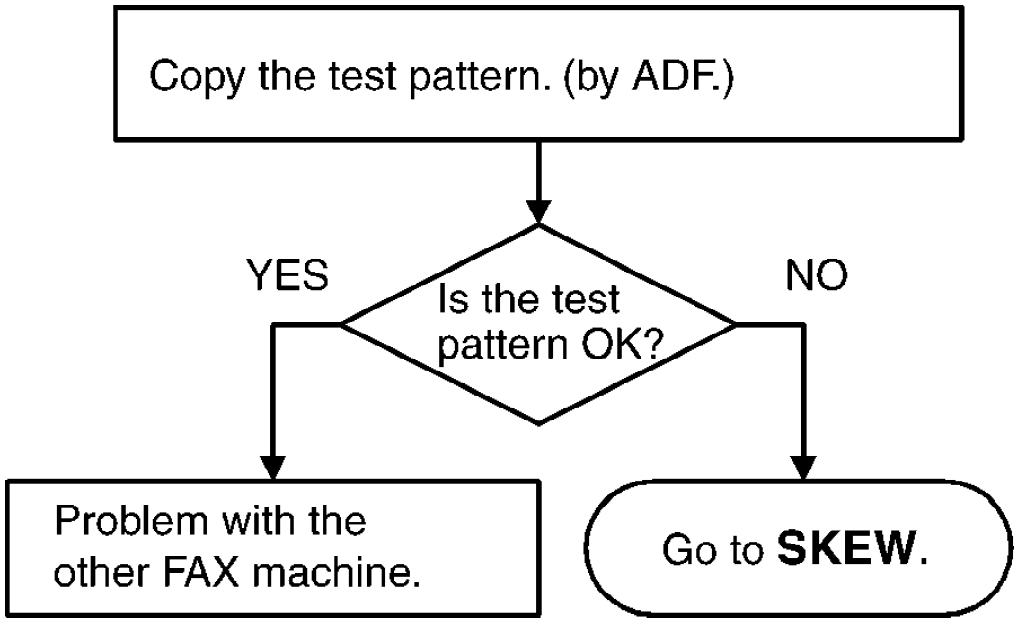


6.5.9.3. THE SENT FAX DATA IS SKEWED



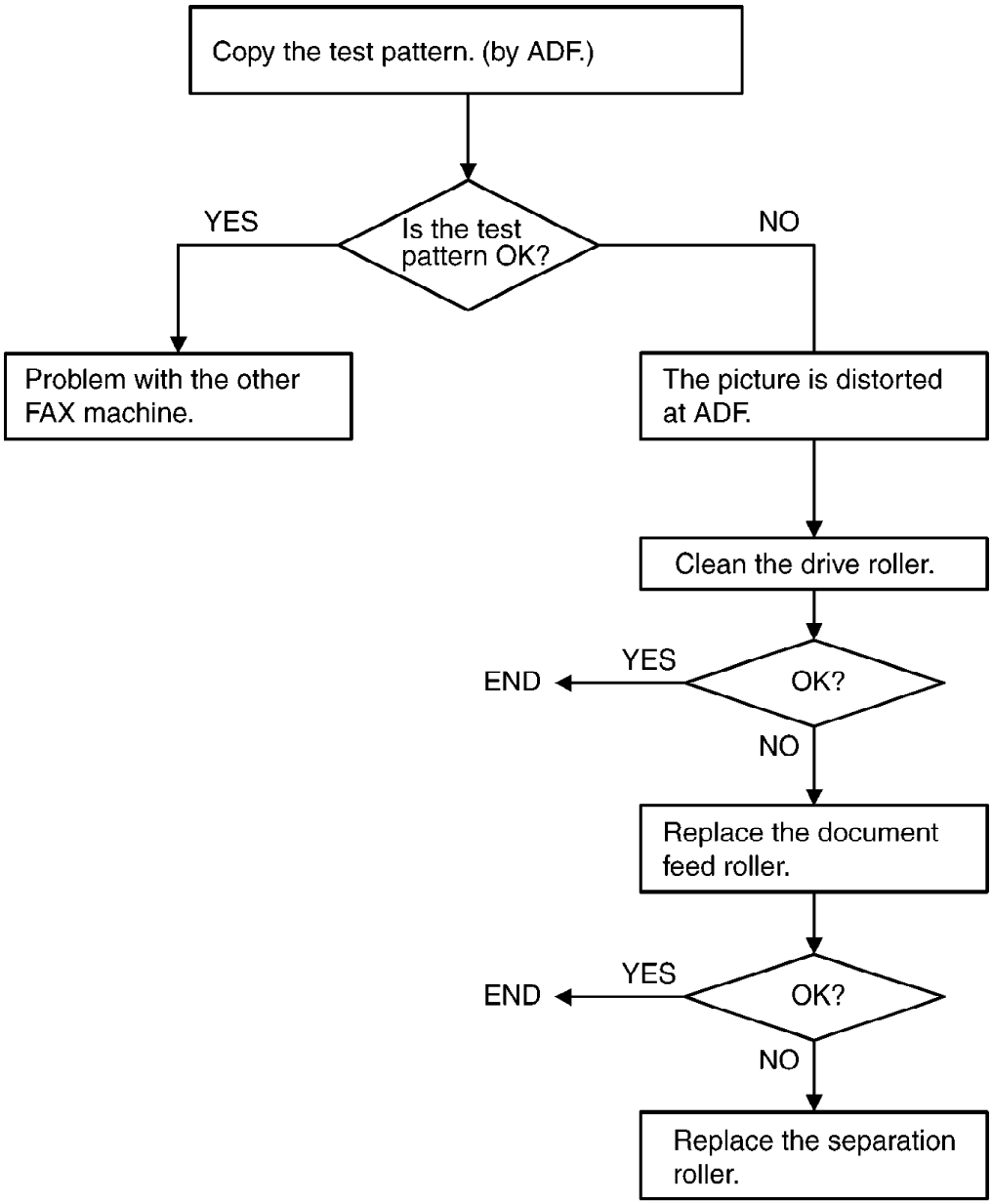
CROSS REFERENCE:
SKEW (ADF) ()

6.5.9.4. THE RECEIVED FAX DATA IS SKEWED

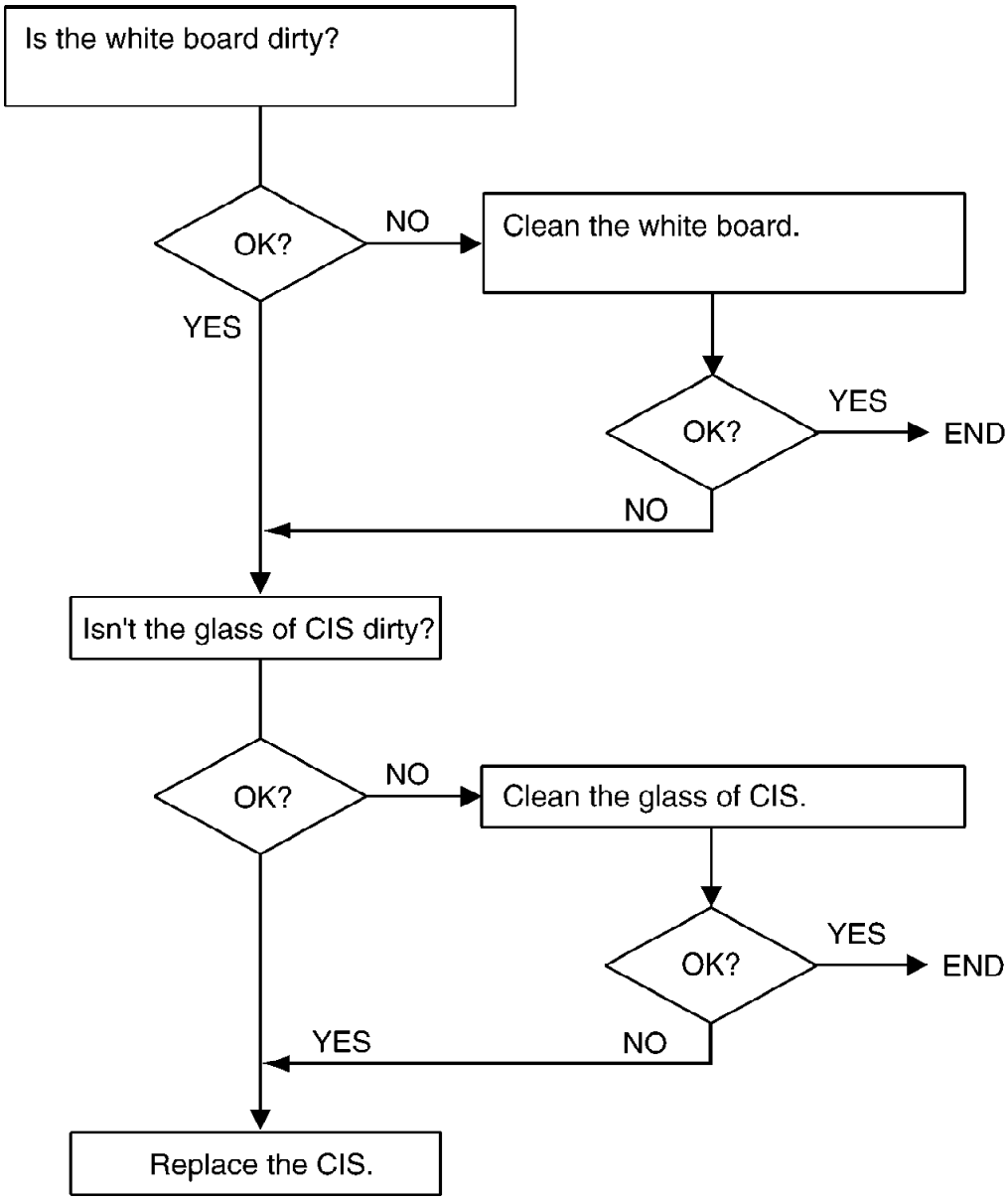


CROSS REFERENCE:
SKEW ()

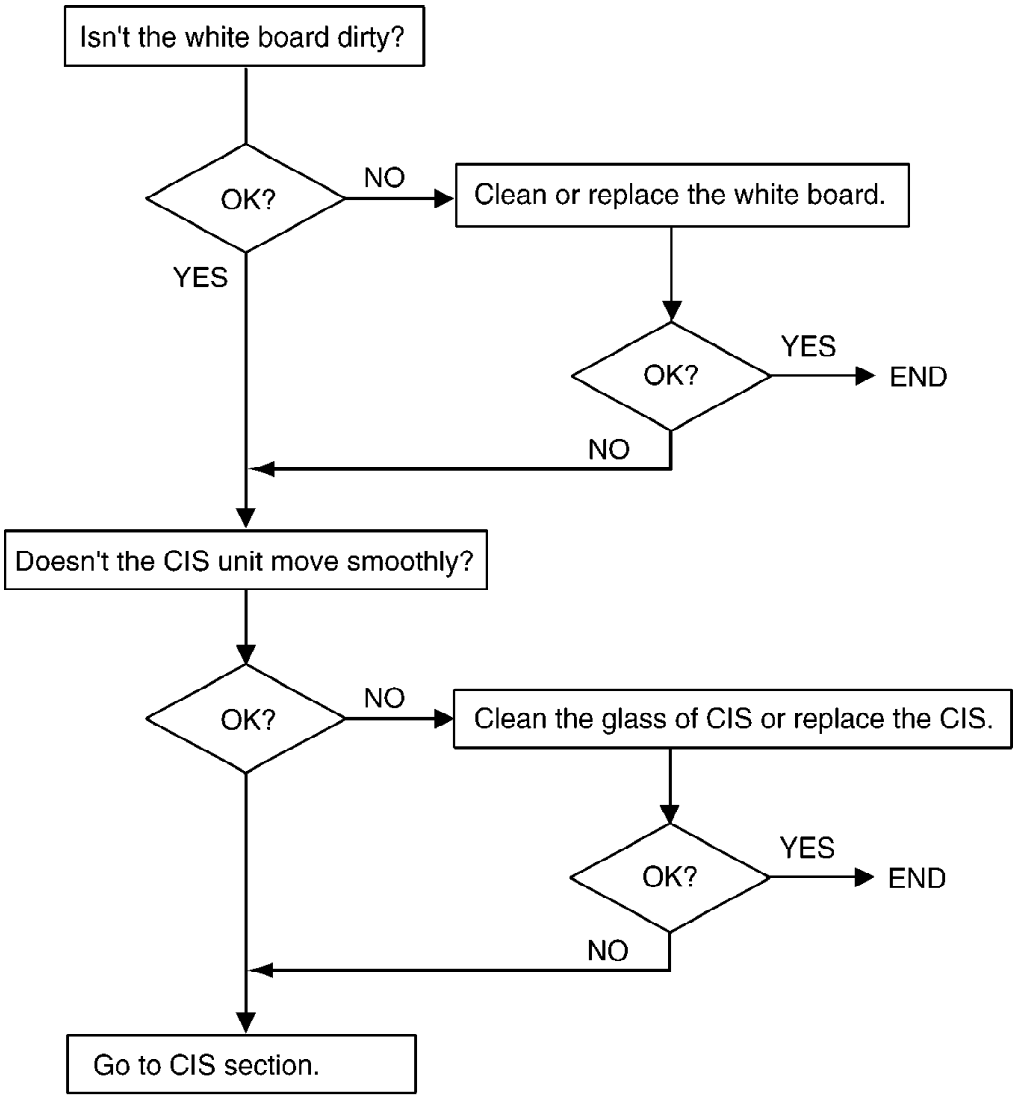
6.5.9.5. THE RECEIVED OR COPIED DATA IS EXPANDED



6.5.9.6. BLACK OR WHITE VERTICAL LINE IS COPIED



6.5.9.7. AN ABNORMAL IMAGE IS COPIED



CROSS REFERENCE:
CIS (Contact Image Sensor) SECTION ()

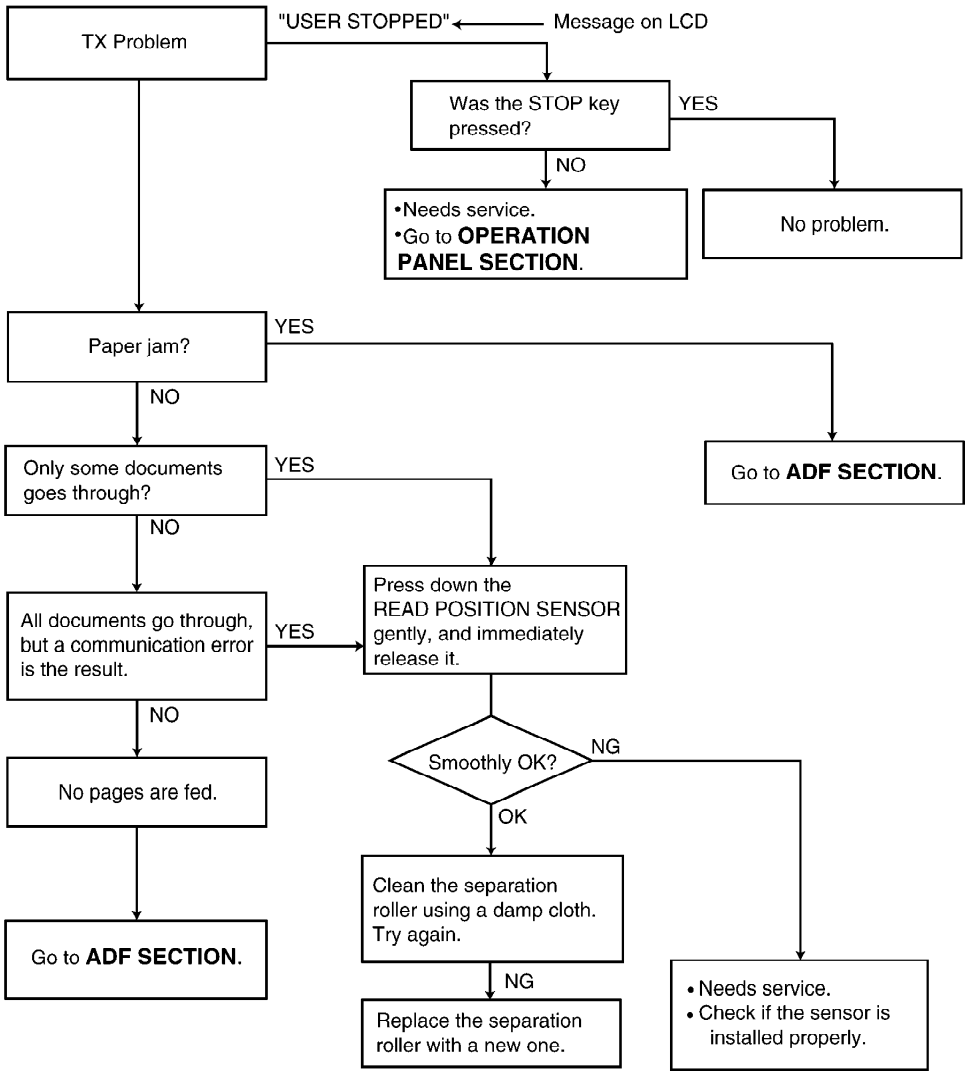
6.5.10. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in DEFECTIVE FACSIMILE SECTION ().

No.	Symptom	Content	Possible cause
1	The paper dose not feed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism. (Refer to TRANSMIT PROBLEM ())
2	The fax transmits successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the receiver's fax. (Refer to SOMETIME THERE IS A TRANSMIT PROBLEM ())
3	The fax receives successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the transmitter's fax. (Refer to RECEIVE PROBLEM ())
4	The fax completely fails to transmit or receive. (Copying is also possible.)	Troubleshooting	Problem with the electric circuit. (Refer to THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE ())
5	The fax fails either to transmit or receive when making a long distance or an international call. (Copying is also possible.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	(Refer to HOW TO OUTPUT THE JOURNAL REPORT ())

6.5.10.1. DEFECTIVE FACSIMILE SECTION

6.5.10.1.1. TRANSMIT PROBLEM



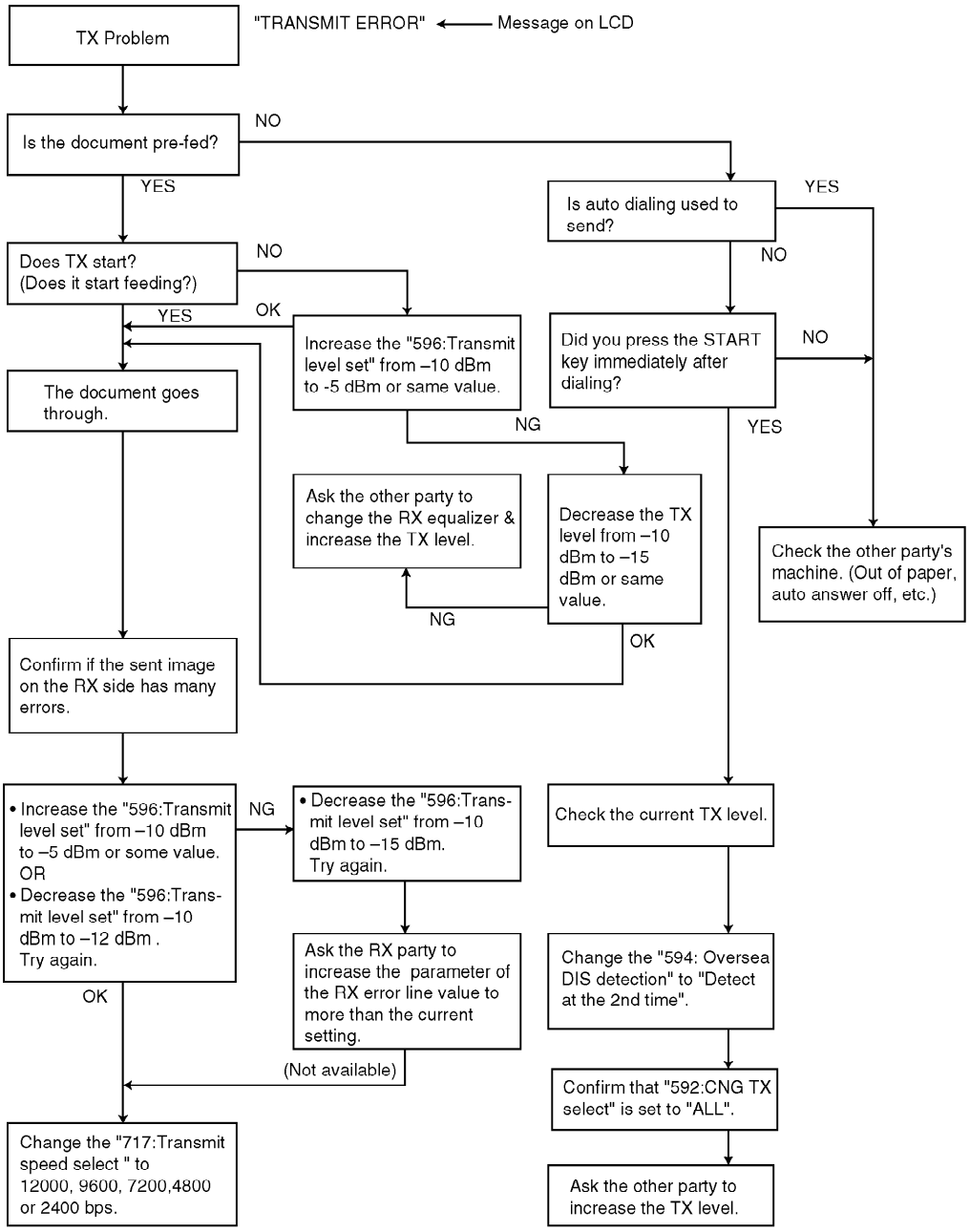
CROSS REFERENCE:

CLEANING THE INSIDE OF THE UNIT ()

ADF (Auto document feed) SECTION ()

OPERATION PANEL SECTION ()

6.5.10.1.2. SOMETIME THERE IS A TRANSMIT PROBLEM



Note:

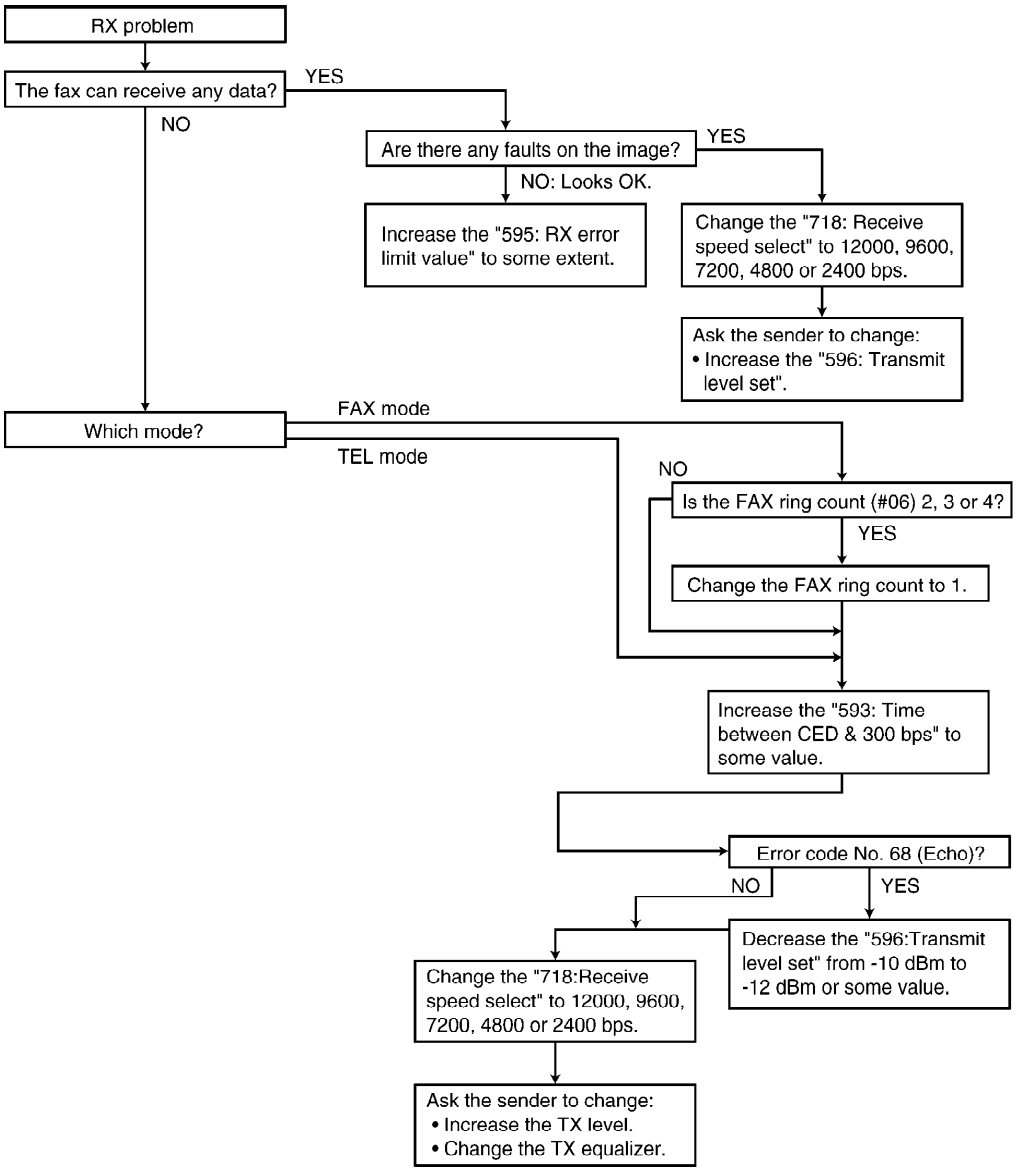
“596: Transmit level set” represents a service code. Refer to the SERVICE FUNCTION TABLE ().

“717: Transmit speed select” represents a service code. Refer to the SERVICE FUNCTION TABLE ().

6.5.10.1.3. RECEIVE PROBLEM

Confirm the following before starting troubleshooting.

- Is the recording paper installed properly? Refer to the next page.



Note:

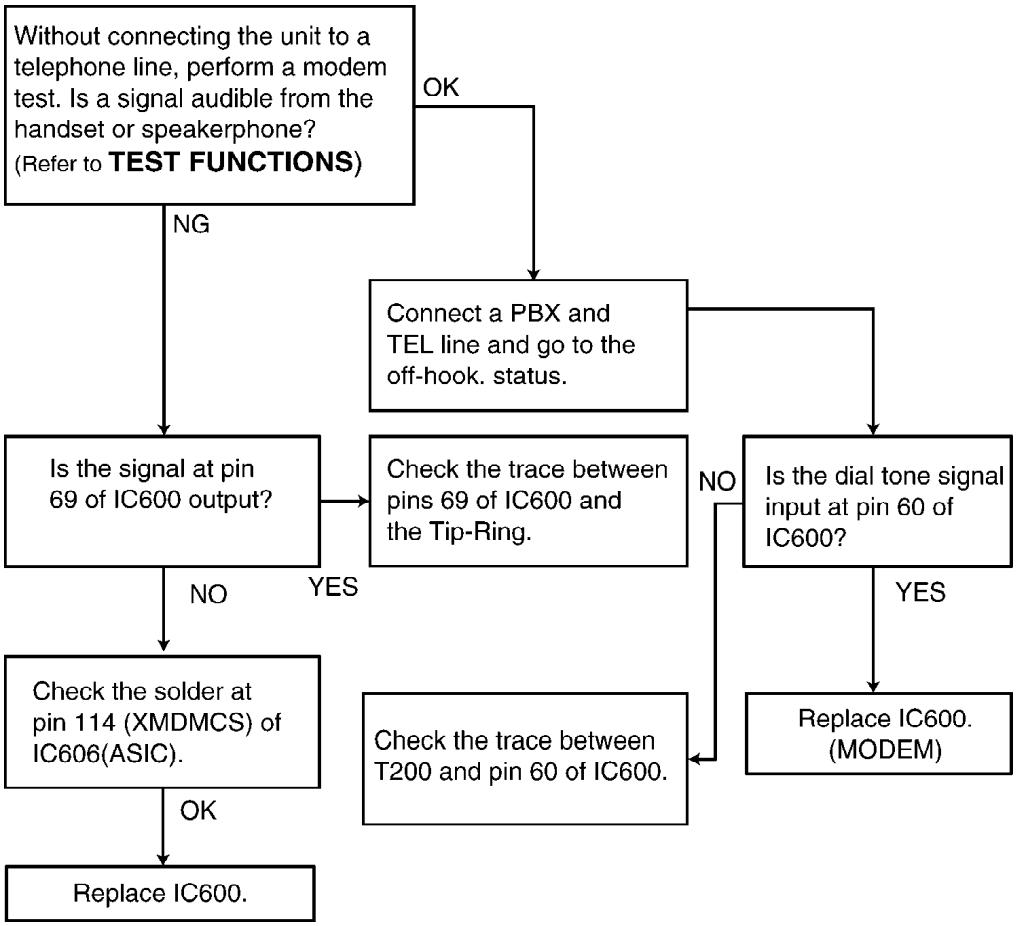
“596: Transmit level set” represents a service code. Refer to the SERVICE FUNCTION TABLE ().

“718: Receive speed select” represents a service code. Refer to the SERVICE FUNCTION TABLE ().

For the receiving problem, we have thought of causes other than in the software. Some causes may be when the fax changes to the memory receiving mode (for example, when out of paper). and the memory becomes full of the unprinted fax data. In this case, [MEMORY FULL] and its main cause (for example, “OUT OF PAPER”) are displayed on the LCD. Accordingly, by solving the main problem, [MEMORY FULL] can be canceled and the receiving problem can solved.

Please refer to USER RECOVERABLE ERRORS () for the above items.
Also, when it actually becomes a hardware deformity, please check each sensor.

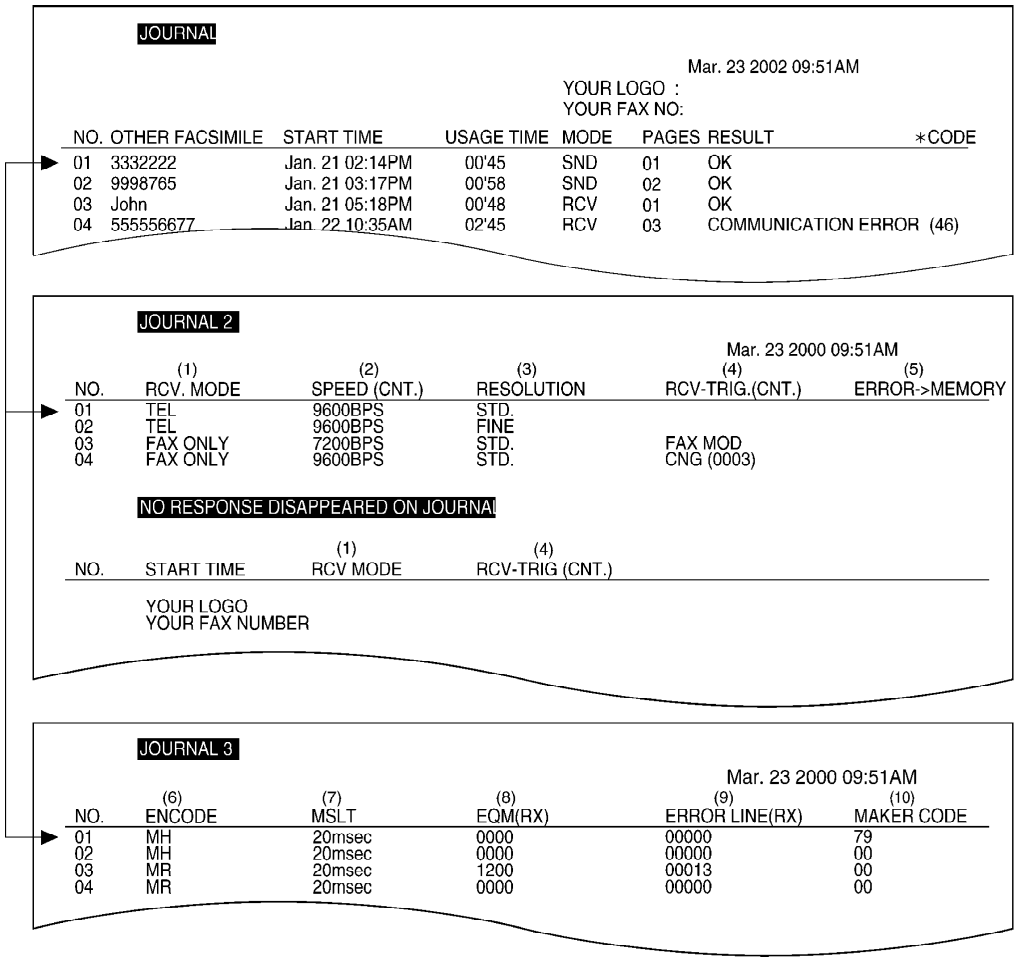
6.5.10.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE



CROSS REFERENCE:
TEST FUNCTIONS ()

6.5.11. SPECIAL SERVICE JOURNAL REPORTS

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to PROGRAM MODE TABLE().) The JOURNAL report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).



JOURNAL

Mar. 23 2002 09:51AM

YOUR LOGO :
YOUR FAX NO:

NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	3332222	Jan. 21 02:14PM	00'45	SND	01	OK	
02	9998765	Jan. 21 03:17PM	00'58	SND	02	OK	
03	John	Jan. 21 05:18PM	00'48	RCV	01	OK	
04	555556677	Jan. 22 10:35AM	02'45	RCV	03	COMMUNICATION ERROR	(46)

JOURNAL 2

Mar. 23 2000 09:51AM

NO.	(1) RCV. MODE	(2) SPEED (CNT.)	(3) RESOLUTION	(4) RCV-TRIG.(CNT.)	(5) ERROR->MEMORY
01	TEL	9600BPS	STD.		
02	TEL	9600BPS	FINE		
03	FAX ONLY	7200BPS	STD.	FAX MOD	
04	FAX ONLY	9600BPS	STD.	CNG (0003)	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	(1) RCV MODE	(4) RCV-TRIG (CNT.)

YOUR LOGO
YOUR FAX NUMBER

JOURNAL 3

Mar. 23 2000 09:51AM

NO.	(6) ENCODE	(7) MSLT	(8) EQM(RX)	(9) ERROR LINE(RX)	(10) MAKER CODE
01	MH	20msec	0000	00000	79
02	MH	20msec	0000	00000	00
03	MR	20msec	1200	00013	00
04	MR	20msec	0000	00000	00

HOW TO READ JOURNAL REPORTS:
Example:

1. **Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the JOURNAL 3. You can get the following information.**
   - *** MODE: Fax transmission**
   - *** RCV. MODE: TEL**
   - *** TX SPEED: 9.6 kbps**
   - *** RESOLUTION: standard**
   - *** ENCODE: MH**
   - *** MAKER CODE: 79**
2. **Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.**

For further details, see JOURNAL 2 and JOURNAL 3.

6.5.11.1. JOURNAL 2

Refer to JOURNAL 2 in PRINTOUT EXAMPLE().
Journal 2 displays the additional detailed information about the last 35 communications.
Descriptions:
(1) RCV. MODE
Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.
(2) SPEED
Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.
(3) RESOLUTION
Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.
(4) RCV-TRIG. (CNT.)
Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in PRINTOUT EXAMPLE(). The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
4	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
5	TURN-ON	Means the unit started to receive after 10 rings. (Remote Turn On: Service Code #573)

(5) ERROR → MEMORY
Indicates the reason why the unit received a fax message in memory.
If you look at No.11 in the JOURNAL 2 in PRINTOUT EXAMPLE(), it shows the fax message was received in memory due to "PAPER OUT" error.
[NO RESPONSE DISAPPEARED ON JOURNAL]
The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)
When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, "No response" will be printed.

6.5.11.2. JOURNAL 3

Refer to JOURNAL 3 in PRINTOUT EXAMPLE().

Description

(6) ENCODE
Compression Code: MH/MR/MMR

(7) MSLT
MSLT means Minimum Scan Line Time. Used only at the factory.

(8) EQM
EQM means Eye Quality Monitor. Used only at the factory.

(9) ERROR LINE (RX)
When an error occurs while receiving a fax, this shows the number of error lines.

(10) MAKER CODE
This shows a 2 digit code of the other party's fax machine brand.
0E: “KX” model
00: Unknown
79: “UF” model
19: “Xerox” model

6.5.11.3. PRINTOUT EXAMPLE

JOURNAL2

Mar. 25 2000 01:59PM

NO.	RCV. MODE	SPEED (CNT.)	RESOLUTION	RCV-TRIG. (CNT.)	ERROR->MEMORY
01	FAX ONLY	9600BPS	FINE.	FAX MOD	
02	FAX ONLY	9600BPS	STD.	FAX MOD	
03	FAX ONLY	9600BPS	FINE.		
04	FAX ONLY	9600BPS	FINE.	FAX MOD	
05	FAX ONLY	9600BPS	FINE.	FAX MOD	
06	FAX ONLY	9600BPS	FINE.	FAX MOD	
07	FAX ONLY	9600BPS	FINE.		
08	FAX ONLY	9600BPS	FINE.		
09	FAX ONLY	9600BPS	FINE.		
10	FAX ONLY	9600BPS	STD.	FAX MOD	
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT
12	FAX ONLY	9600BPS	STD.	FAX MOD	
13	FAX ONLY	9600BPS	STD.		
14	FAX ONLY	?	?		
15	FAX ONLY	?	?		
16	FAX ONLY	?	?		
17	FAX ONLY	9600BPS	STD.		
18	FAX ONLY	9600BPS	FINE.	FAX MOD	
19	FAX ONLY	9600BPS	STD.	FAX MOD	
20	FAX ONLY	9600BPS	S-FINE.		
21	FAX ONLY	9600BPS	FINE.		
22	FAX ONLY	9600BPS	FINE.	FAX MOD	
23	FAX ONLY	?	?	FAX MOD	
24	FAX ONLY	9600BPS	STD.	FAX MOD	
25	FAX ONLY	9600BPS	STD.	FAX MOD	
26	FAX ONLY	9600BPS	FINE.	FAX MOD	
27	FAX ONLY	9600BPS	FINE.		
28	FAX ONLY	9600BPS	STD.	FAX MOD	
29	FAX ONLY	9600BPS	FINE.	FAX MOD	
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD	
31	FAX ONLY	9600BPS	STD.	FAX MOD	
32	FAX ONLY	9600BPS	STD.	FAX MOD	
33	FAX ONLY	?	?	FAX MOD	
34	FAX ONLY	9600BPS	STD.	FAX MOD	
35	FAX ONLY	9600BPS	STD.	FAX MOD	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV MODE	RCV-TRIG. (CNT.)

JOURNAL3

Mar. 25 2000 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

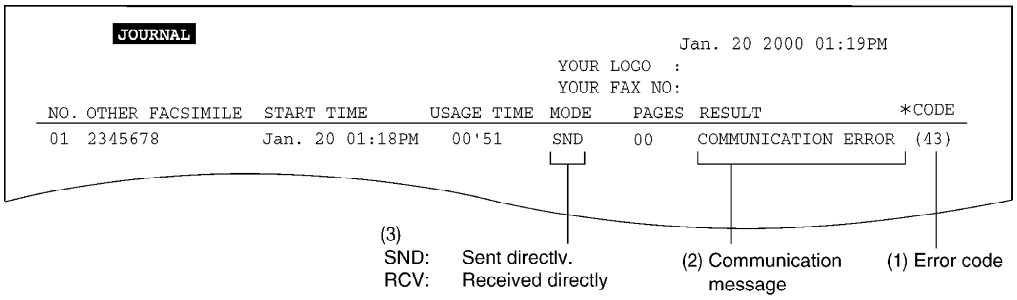
6.5.11.4. HOW TO OUTPUT THE JOURNAL REPORT

1. Press the MENU button.

2. Press “#”, then “8” and “3”.

3. Press the START/COPY/SET button.

4. The report prints out.



CROSS REFERENCE:
FEATURES()

Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	THE COVER WAS OPENED	SND	The cover is open.	
28	COMMUNICATION ERROR	SND & RCV	----------.	
40	COMMUNICATION ERROR	SND	Transmission is finished when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BSP training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	RCV	No post message.	
49	COMMUNICATION ERROR	RCV	RTN is transmitted.	
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).	
51	COMMUNICATION ERROR	RCV	PIN is transmitted.	
52	COMMUNICATION ERROR	RCV	Reception is finished when the T1 TIMER expires.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.	
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.	
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	

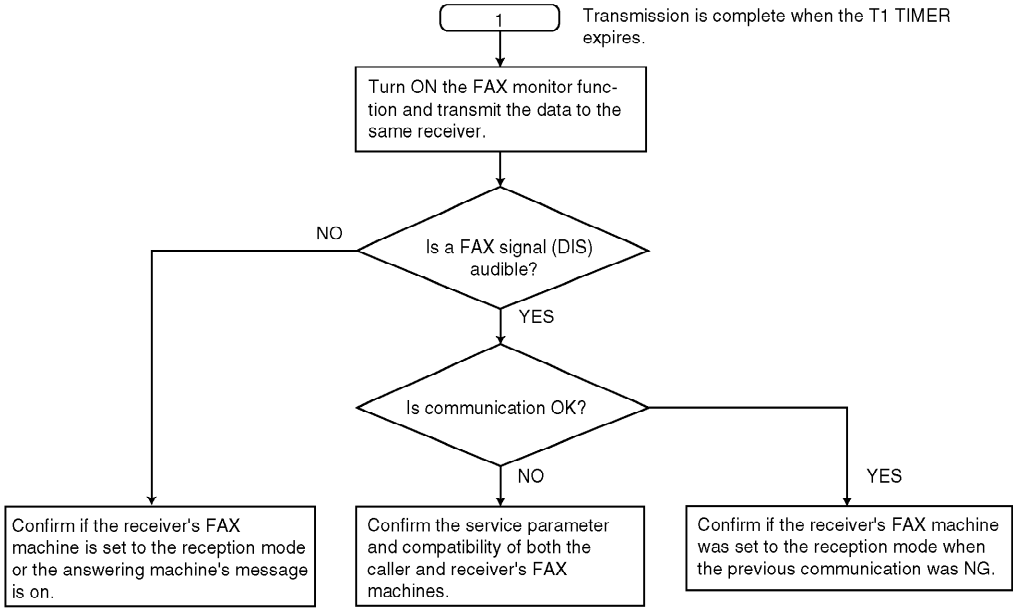
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.	
75	MEMORY FULL	RCV	The document was not received due to memory full.	
79	CANCELED	SND	The multi-station transmission was rejected by the user.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to MODEM SECTION ().	

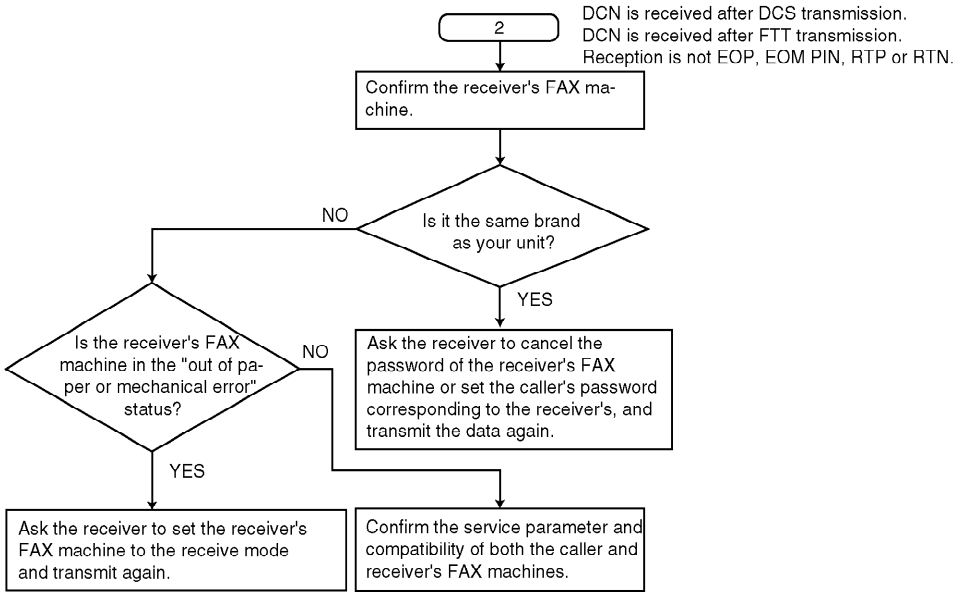
SND=TRANSMISSION / RCV=RECEPTION
Most fax communication problems can be resolved by the following steps.

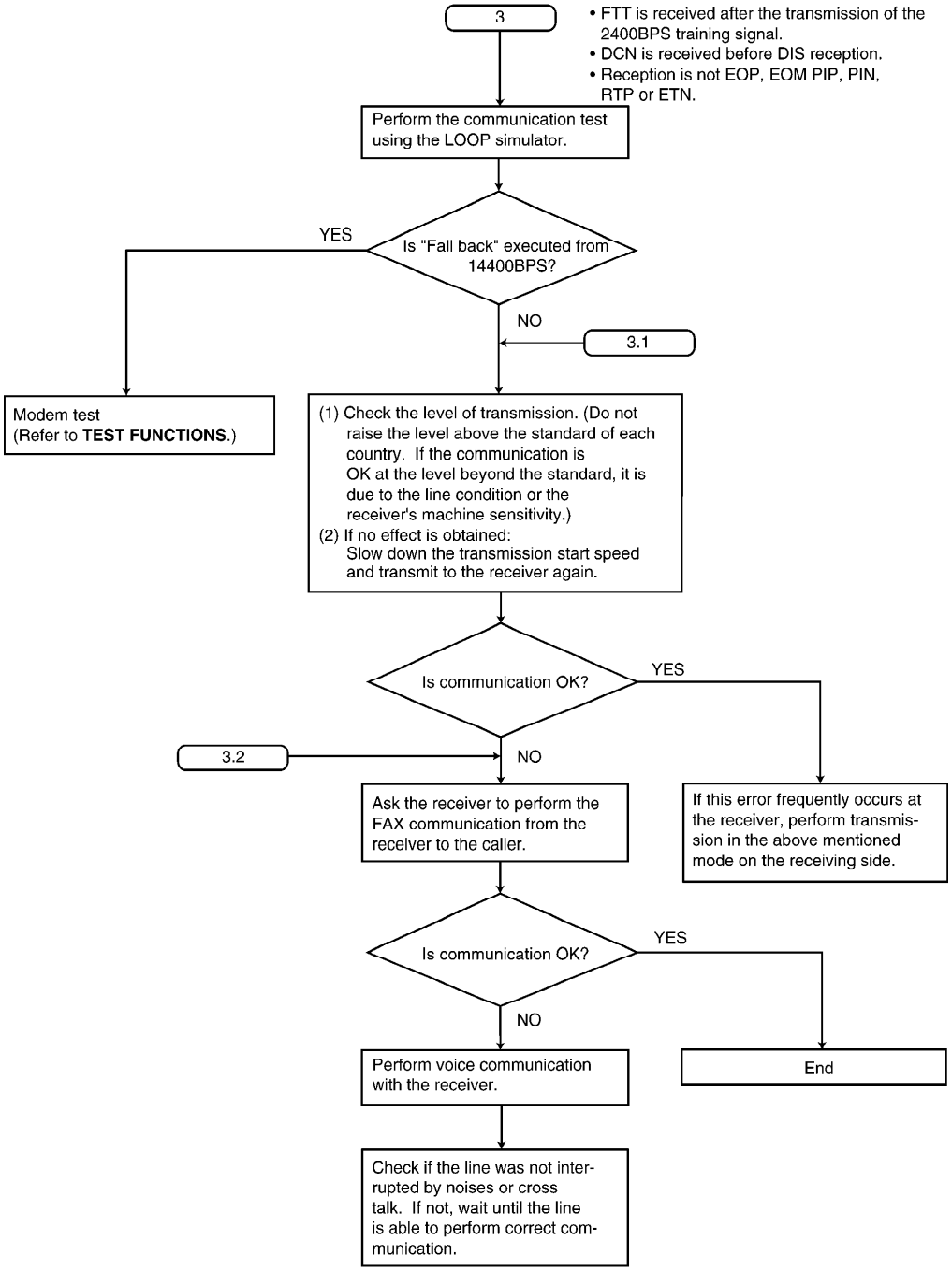
1. **Change the transmit level. (Service code: 596, refer to SERVICE FUNCTION TABLE().)**
2. **Change the TX speed/RX speed. (Service code: 717/718, refer to SERVICE FUNCTION TABLE ().)**

Note*:
If the problem remains, see the following “Countermeasure” flow chart.

Countermeasure

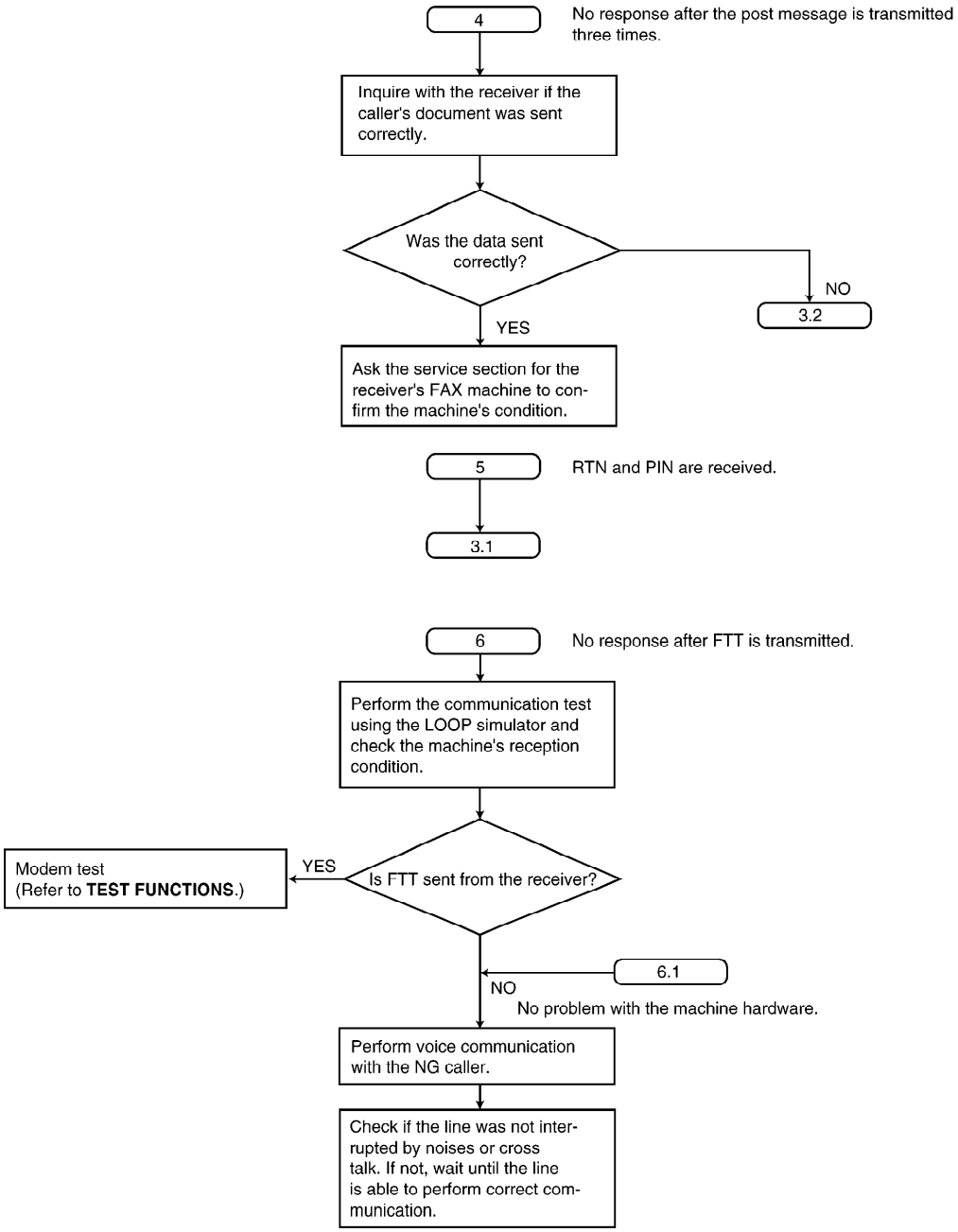




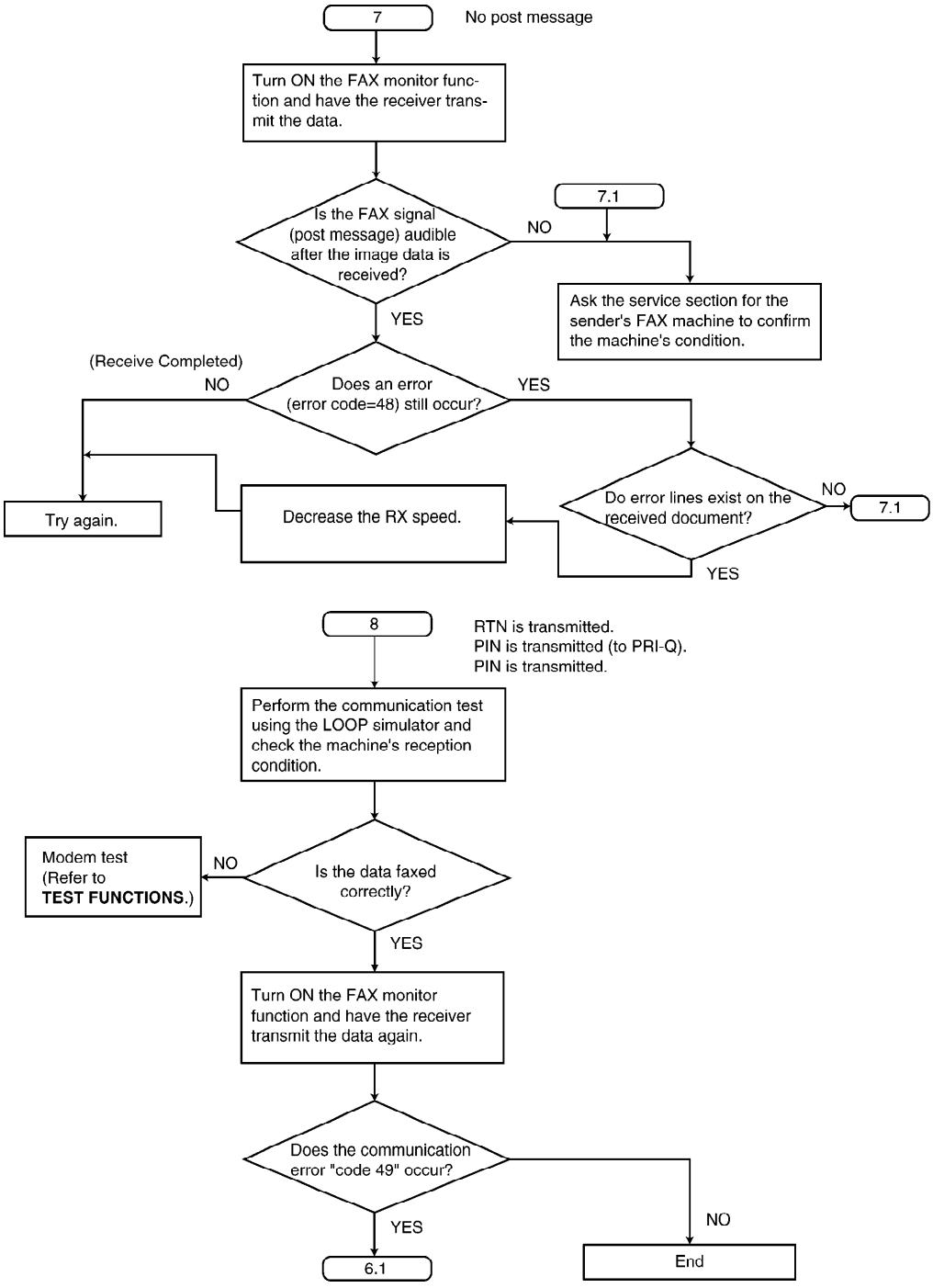


CROSS REFERENCE:

TEST FUNCTIONS ()

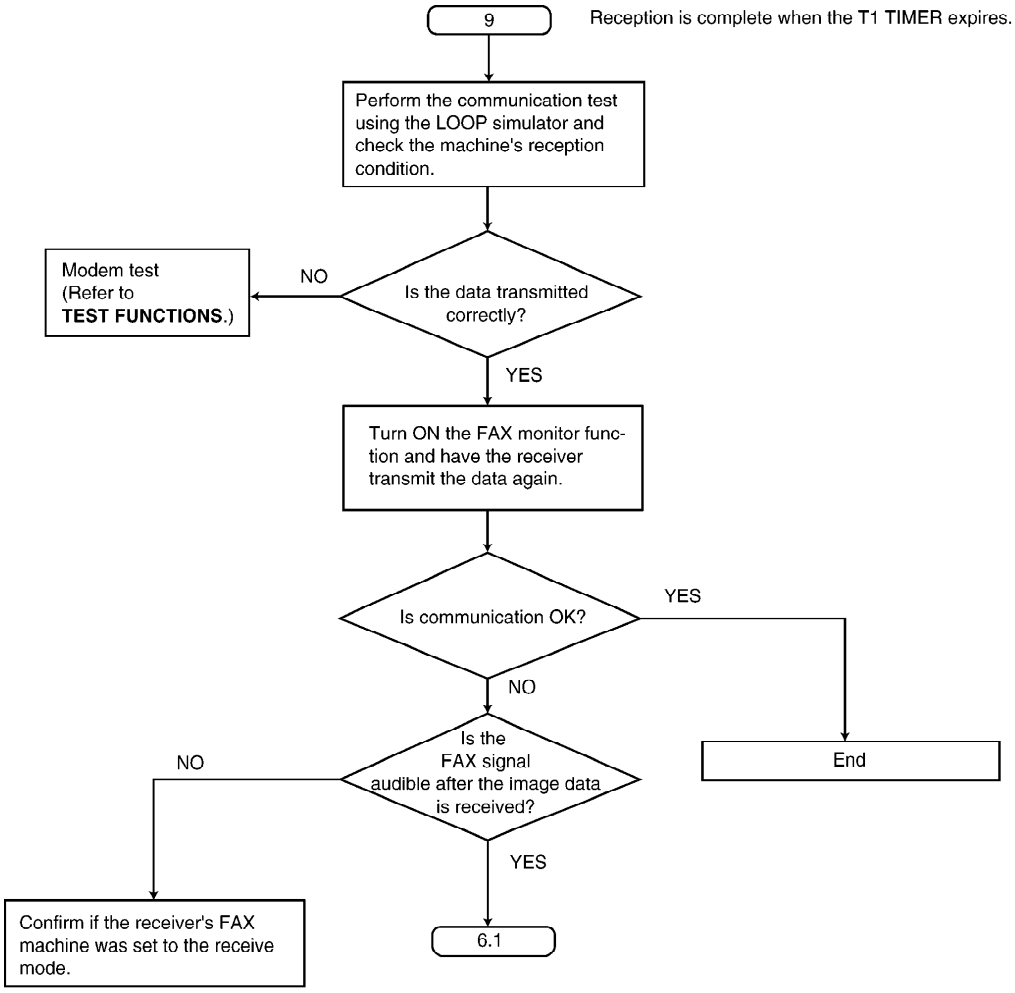


CROSS REFERENCE:
TEST FUNCTIONS ()



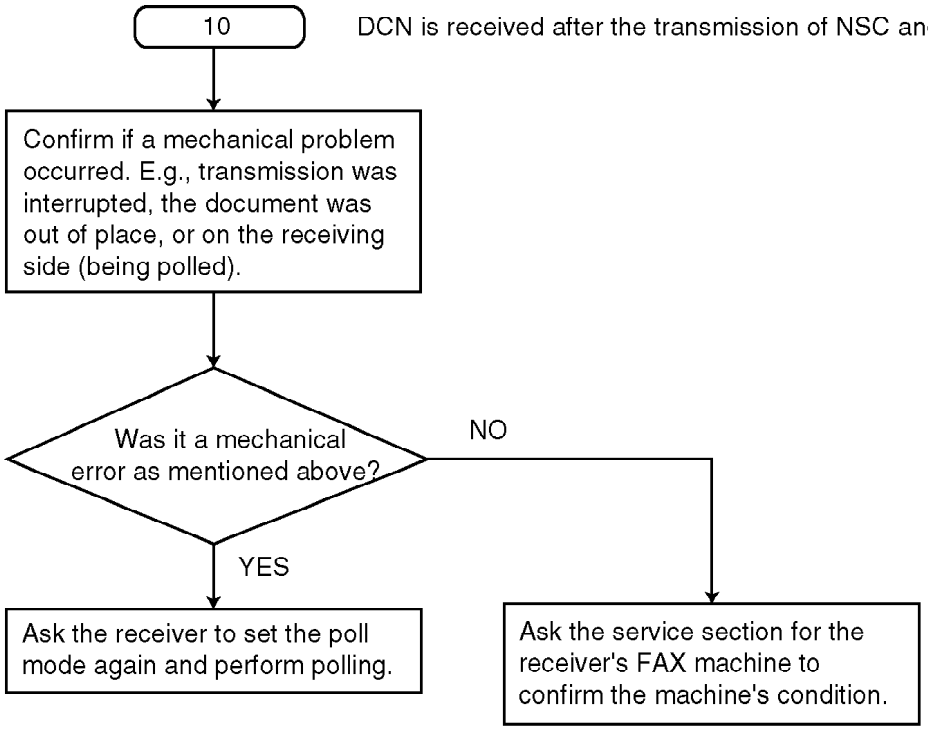
CROSS REFERENCE:

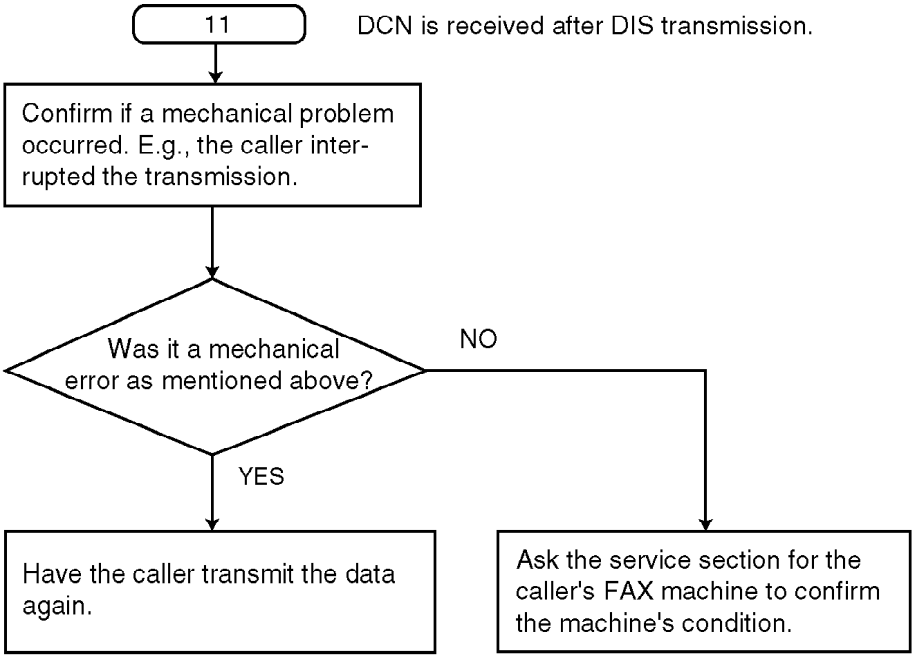
TEST FUNCTIONS ()

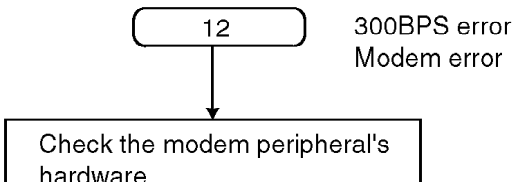


CROSS REFERENCE:

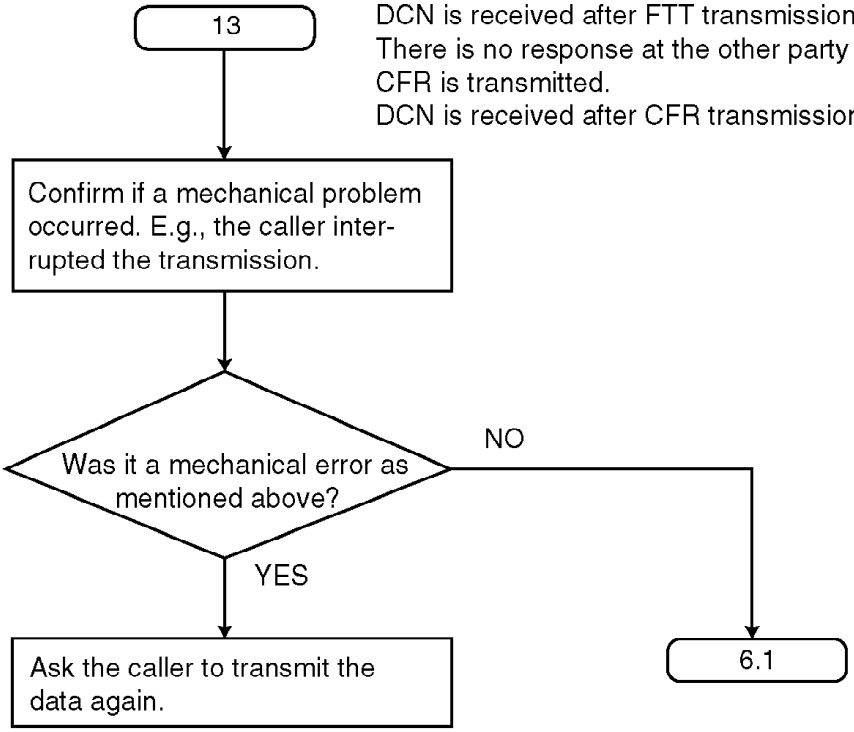
TEST FUNCTIONS ()

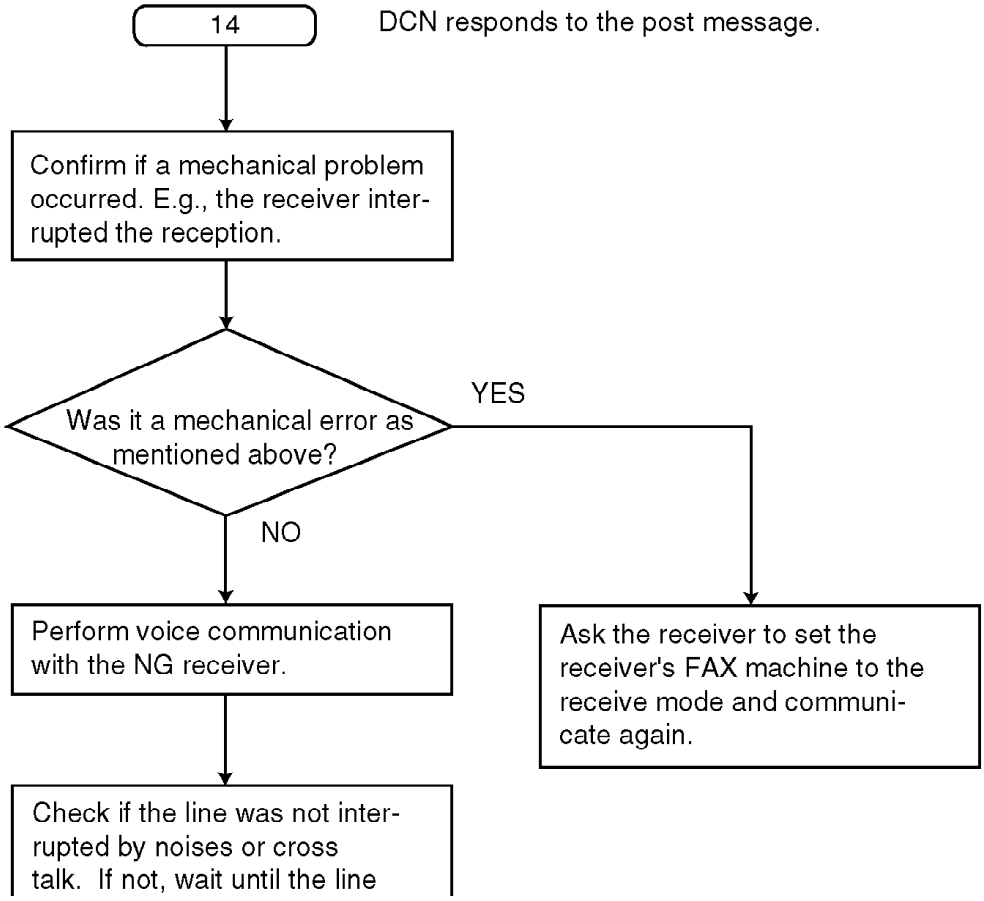

10
DCN is received after the transmission of NSC and DTC.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

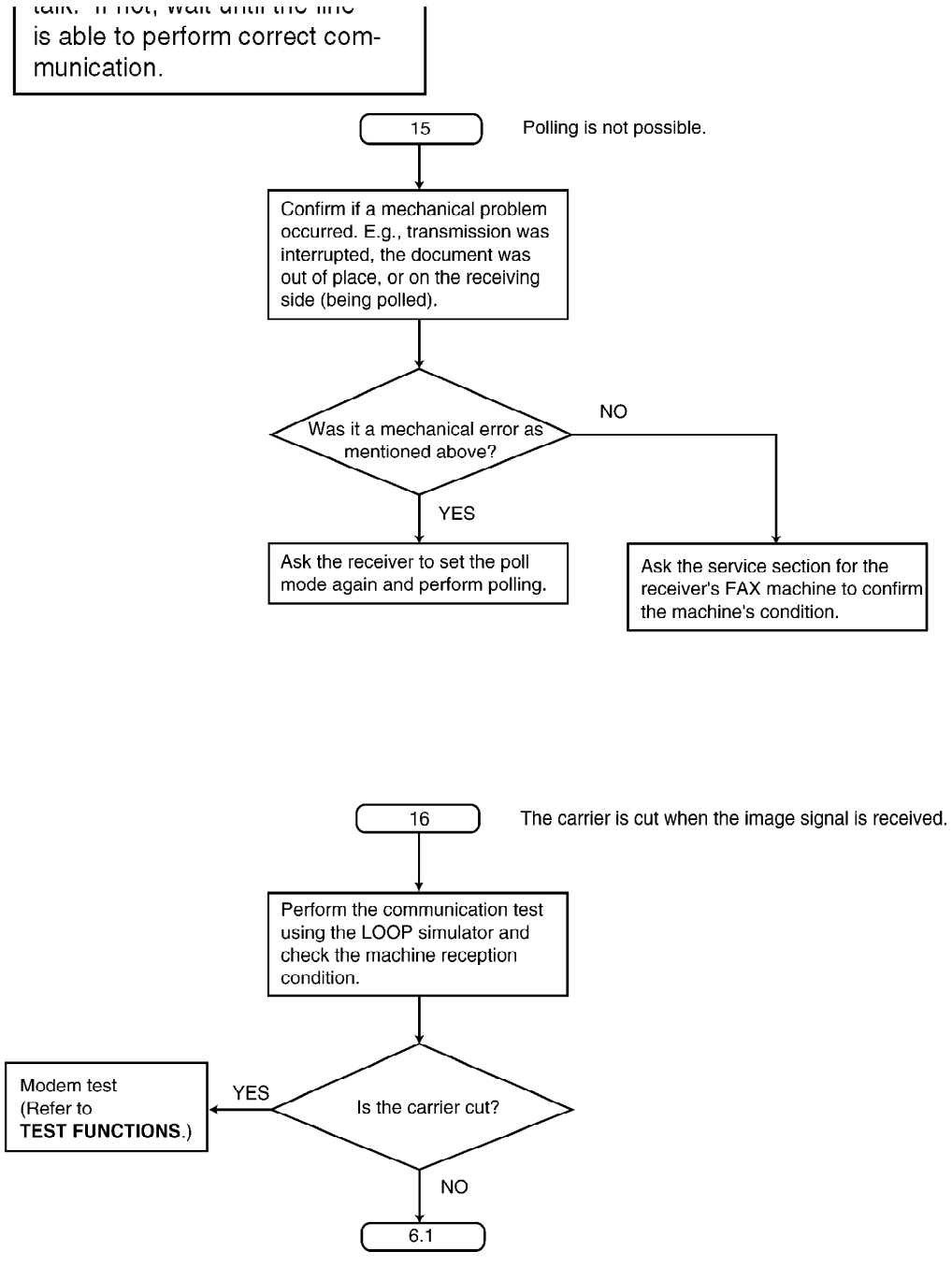

11
DCN is received after DIS transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.


12
300BPS error
Modem error
Check the modem peripheral's hardware

hardware.


13
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1

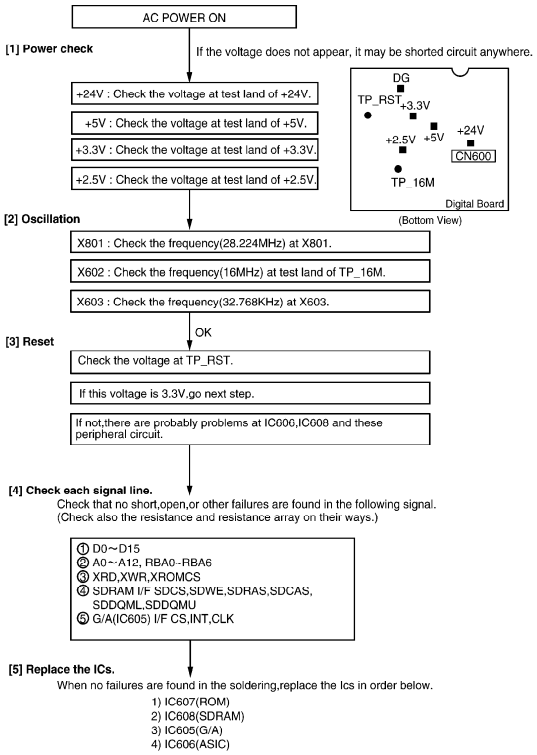

14
DCN responds to the post message.
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line



CROSS REFERENCE:
TEST FUNCTIONS ()

6.5.12. INITIALIZING ERROR

After the power is turned on, the ASIC (IC606) initializes and checks each IC.
The ROM (IC607), SDRAM (IC604), and MODEM (IC600) are checked.
If initialization fails for the ICs, the system will not boot up.
In this case, please find the cause as follows.

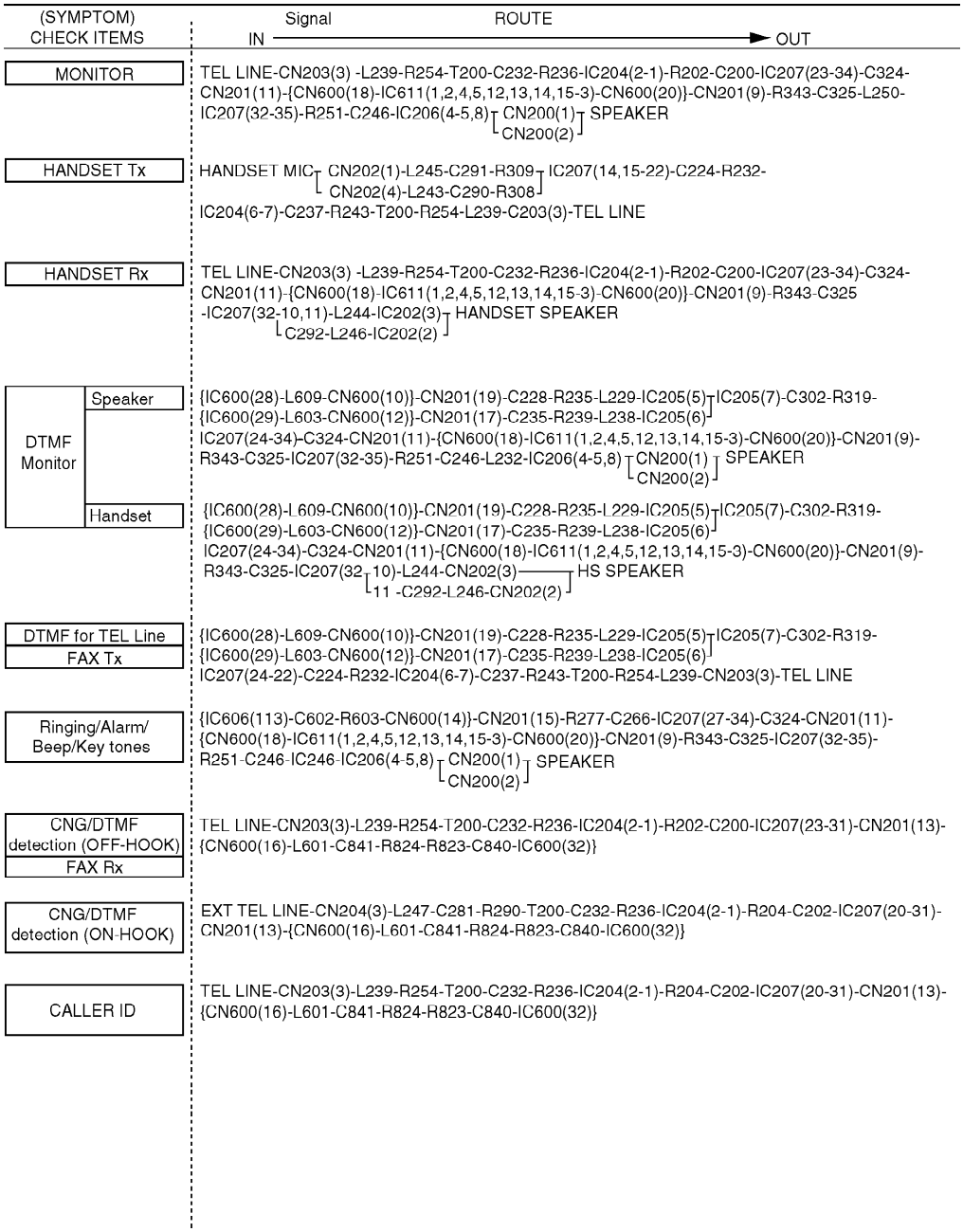


CROSS REFERENCE:
NG EXAMPLE ()
POWER SUPPLY BOARD SECTION ()

6.5.13. ANALOG BOARD SECTION

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

6.5.13.1. CHECK SHEET



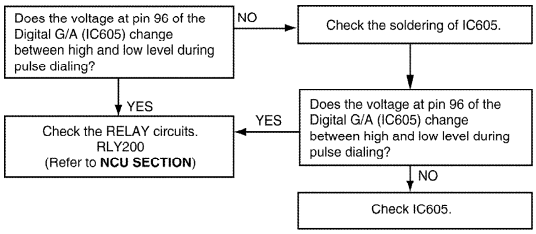
Note: { }: Inside the digital board

6.5.13.2. DEFECTIVE ITS (Integrated Telephone System) SECTION

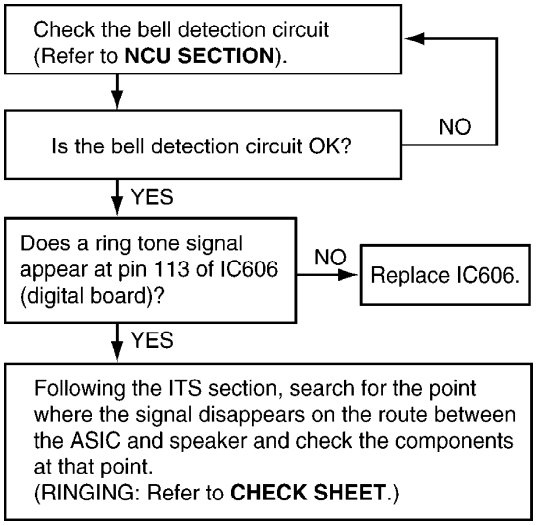
1. No handset and speakerphone transmission / reception

Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. CHECK SHEET() is useful for this investigation.

2. No pulse dialing

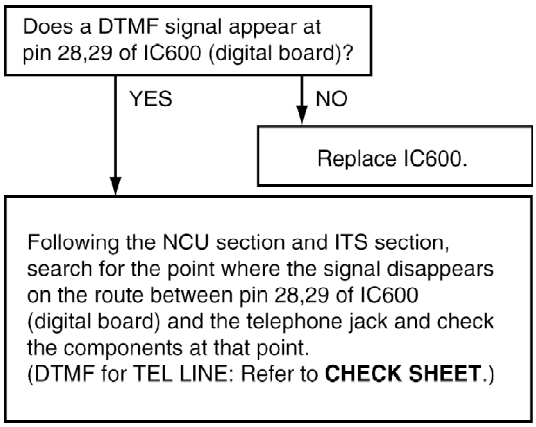


3. No ring tone (or No bell)



CROSS REFERENCE:
CHECK SHEET ()
NCU SECTION ()

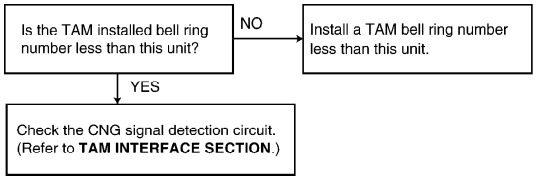
4. No tone dialing



CROSS REFERENCE:
CHECK SHEET ()

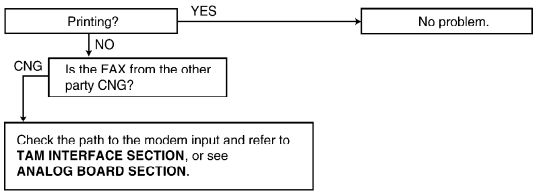
6.5.13.3. DETECTIVE TAM INTERFACE SECTION

1. The FAX turns on, but does not arrive through TAM.



CROSS REFERENCE:
TAM INTERFACE SECTION ()

2. A FAX is received, but won't switch from TAM to FAX.

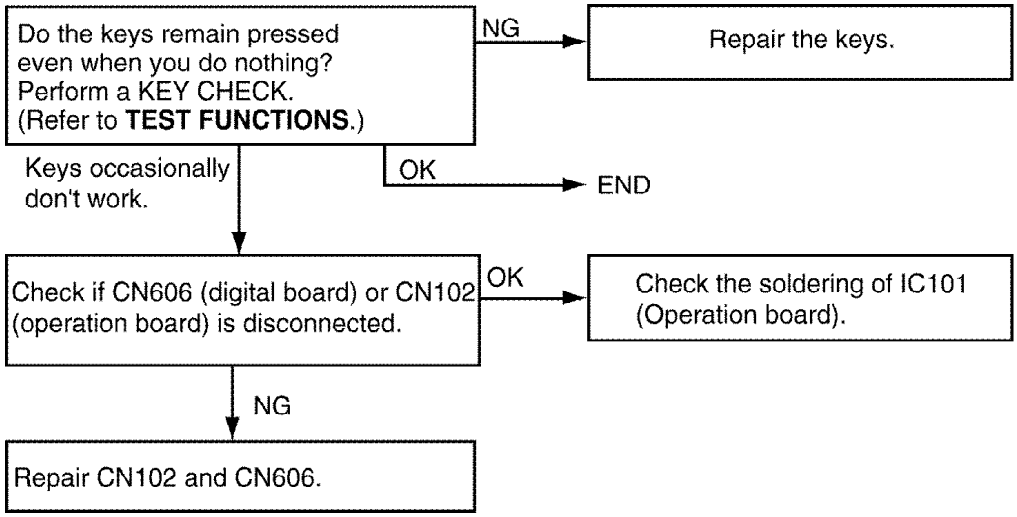


CROSS REFERENCE:
ANALOG BOARD SECTION ()
TAM INTERFACE SECTION ()

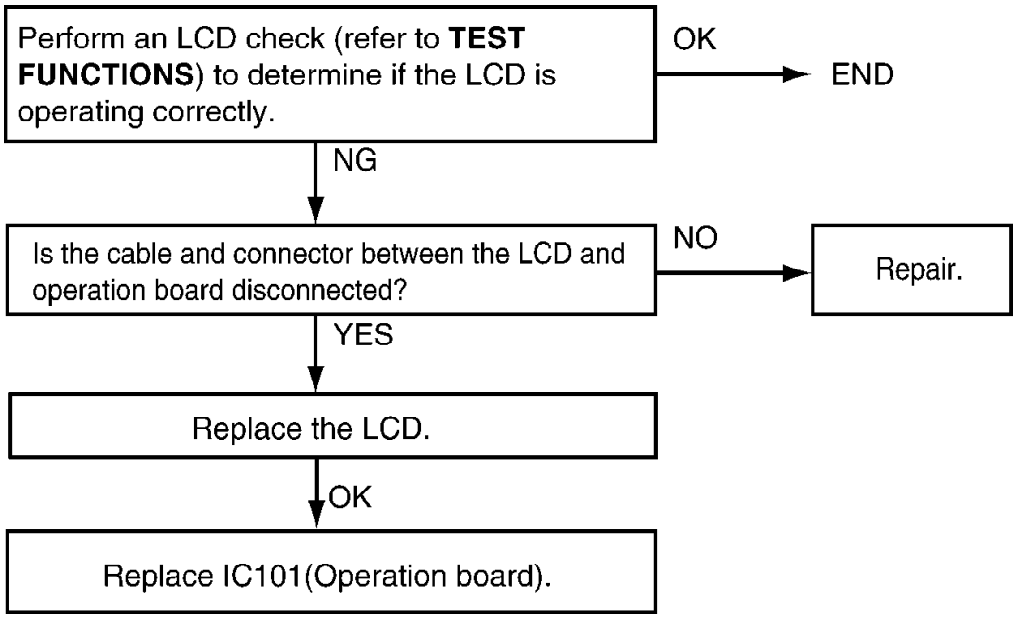
6.5.13.4. OPERATION PANEL SECTION

Refer to TEST FUNCTIONS ().

1. NO KEY OPERATION



2. NO LCD INDICATION

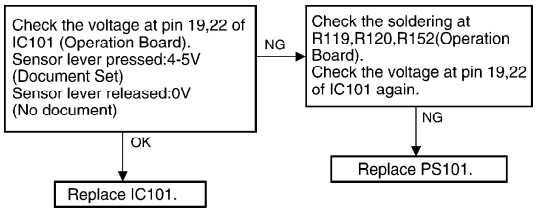


CROSS REFERENCE:
TEST FUNCTIONS ()

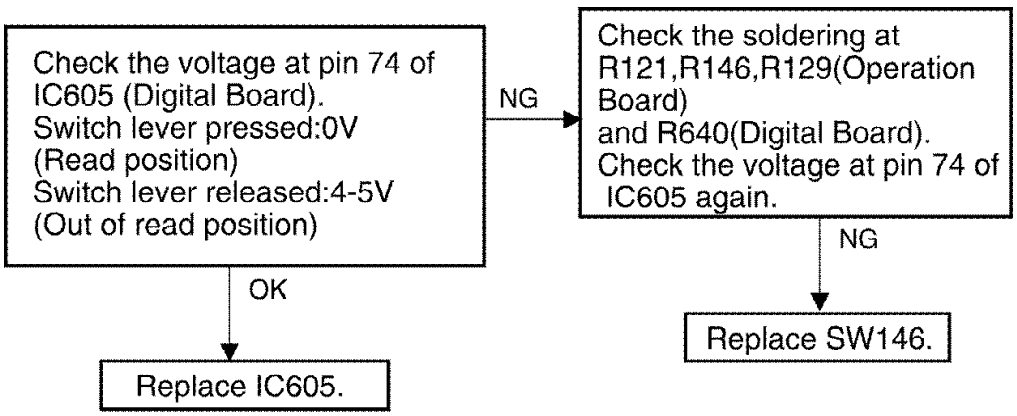
6.5.13.5. SENSOR SECTION

Refer to SENSORS AND SWITCHES for the circuit description.
Perform an SENSOR CHECK to determine if the sensor is operating correctly.

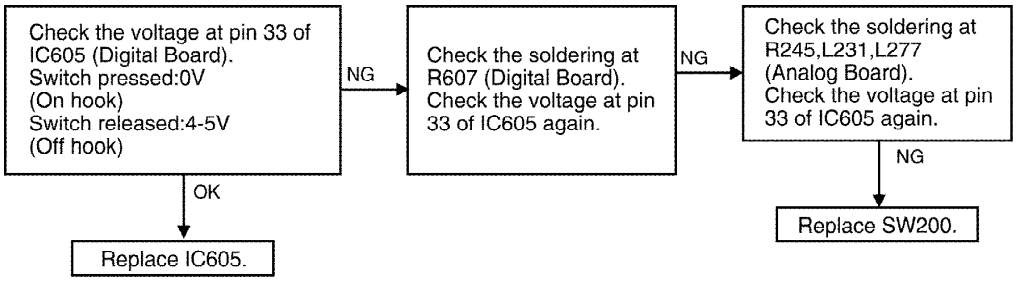
1. Check the ..... "CHECK DOCUMENT"



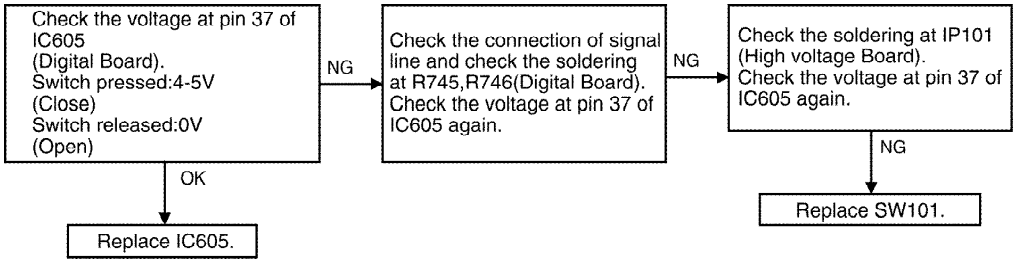
2. Check the paper feed sensor..... "REMOVE DOCUMENT"



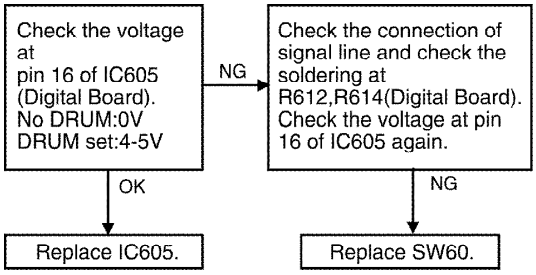
3. Check the hook switch



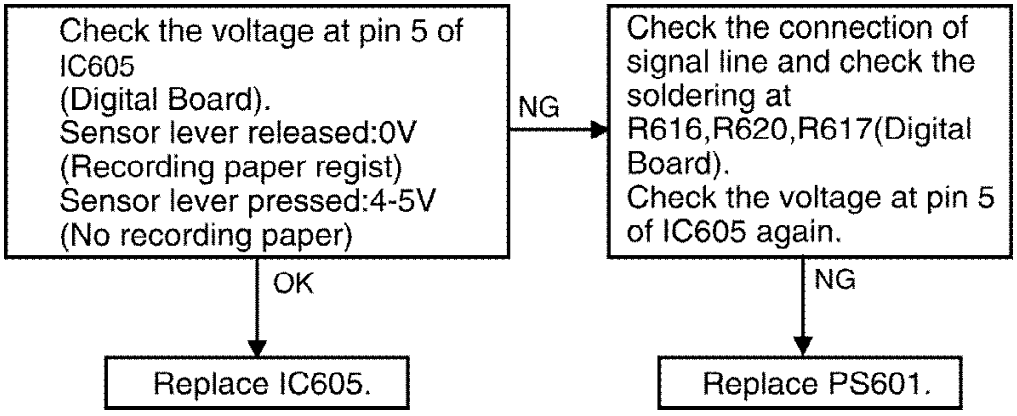
4. Check the cover open switch..... "COVER OPEN"



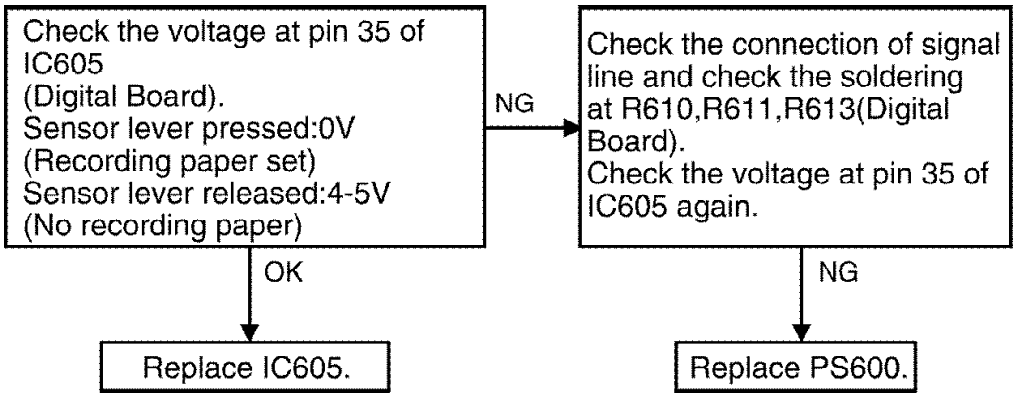
5. Check the DRUM sensor..... "CHECK DRUM"



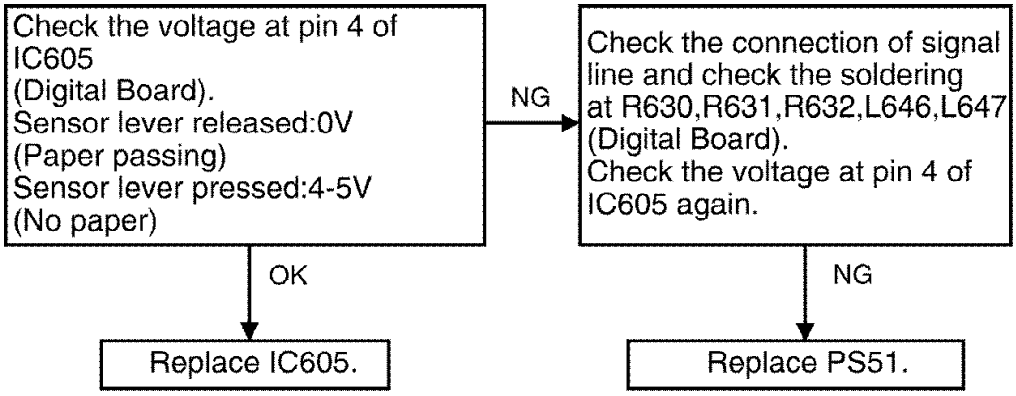
6. Check the regist sensor..... "FAILED PICKUP"



7. Check the paper sensor..... "OUT OF PAPER"

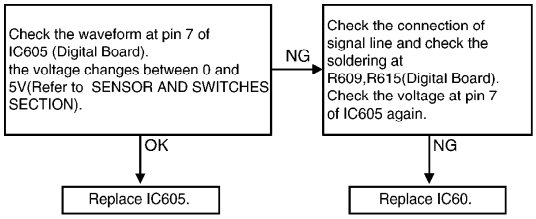


8. Check the exit switch..... "PAPER JAMMED"



9. Check the toner sensor..... "TONER LOW", "CHANGE DRUM"

As for the following check, remove the drum from the main body, set it again and close the cover, then perform that check during initializing operation. Refer to SENSORS AND SWITCHES SECTION ().

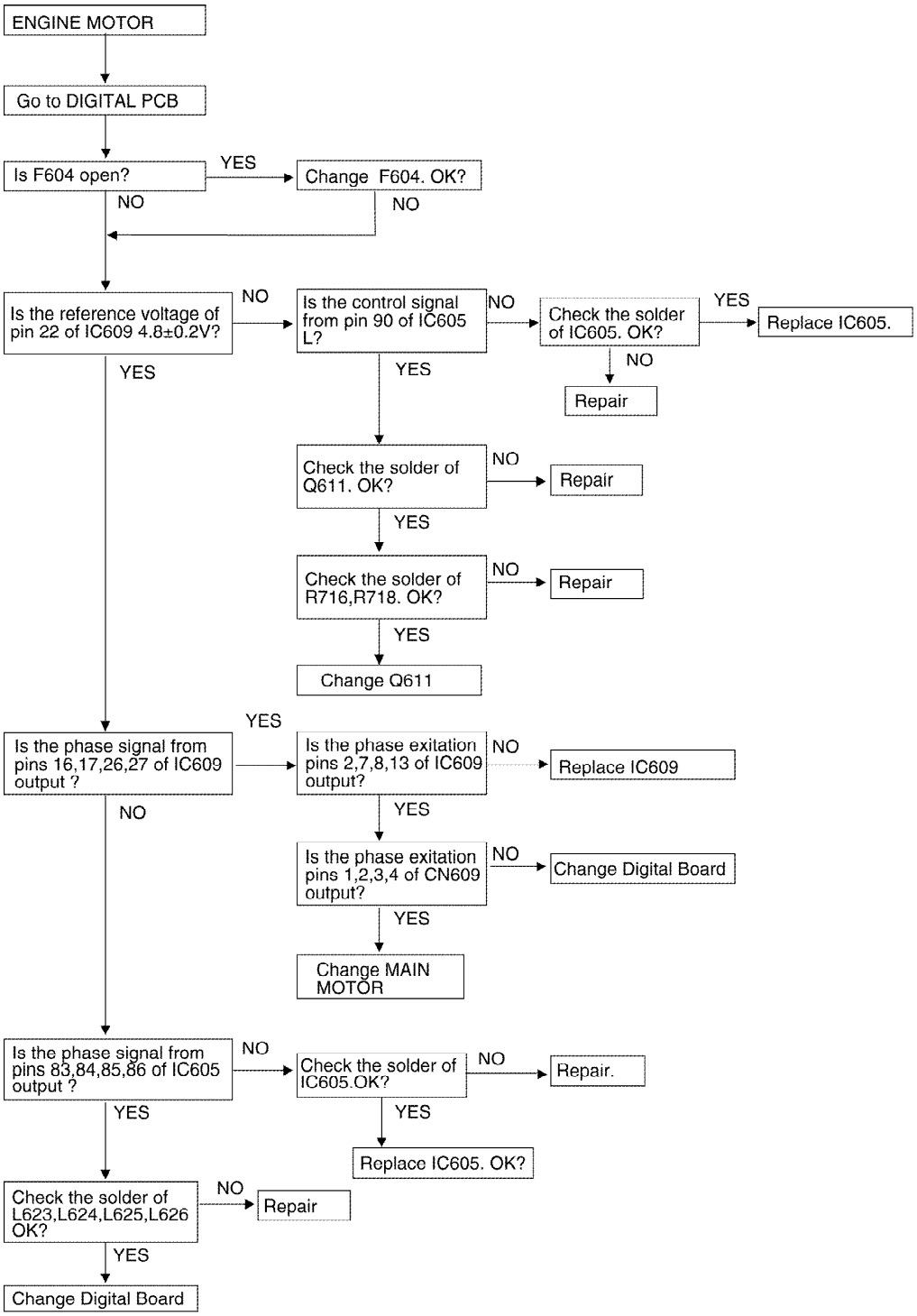


CROSS REFERENCE:

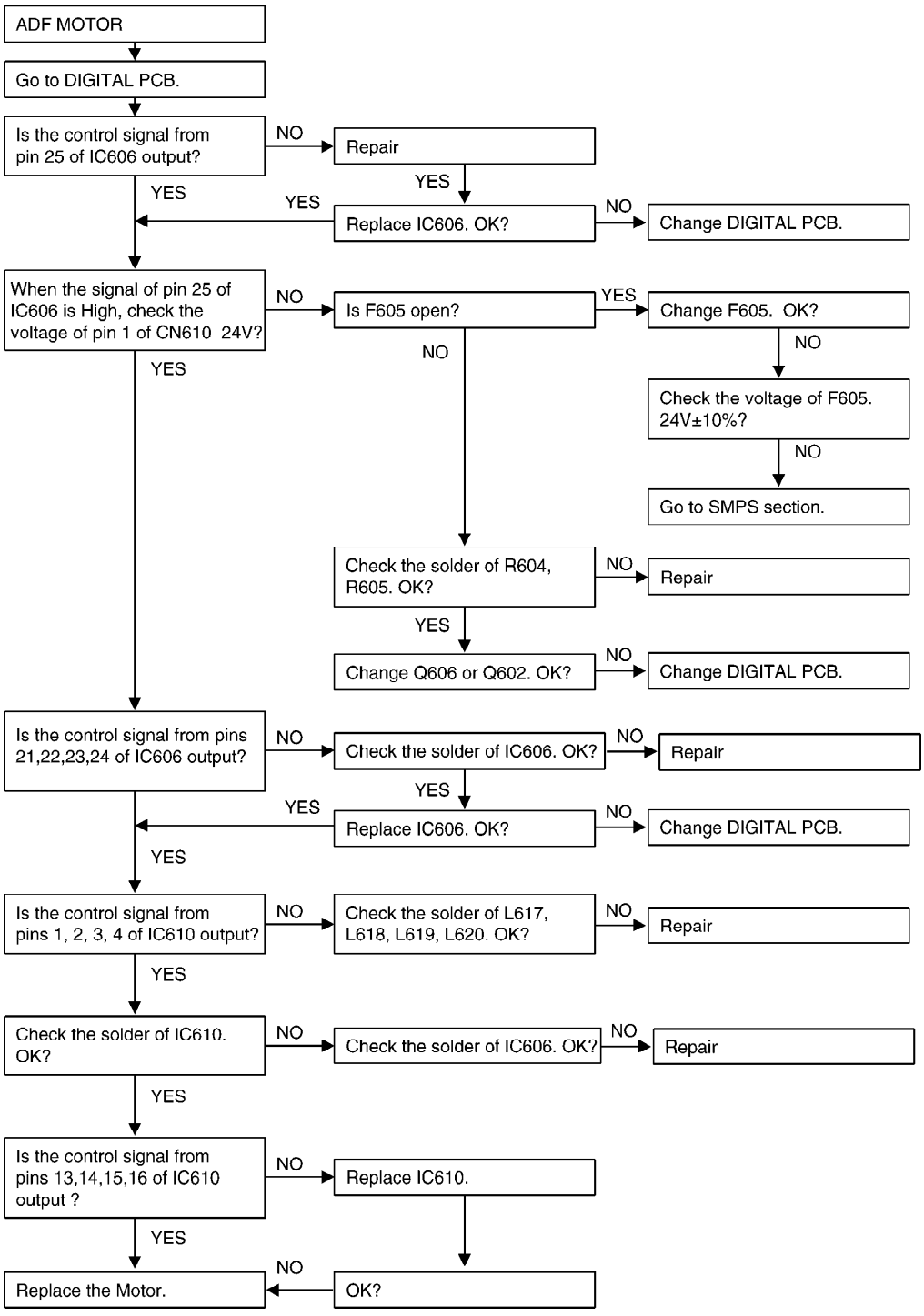
SENSORS AND SWITCHES SECTION ()

6.5.13.6. MOTOR SECTION

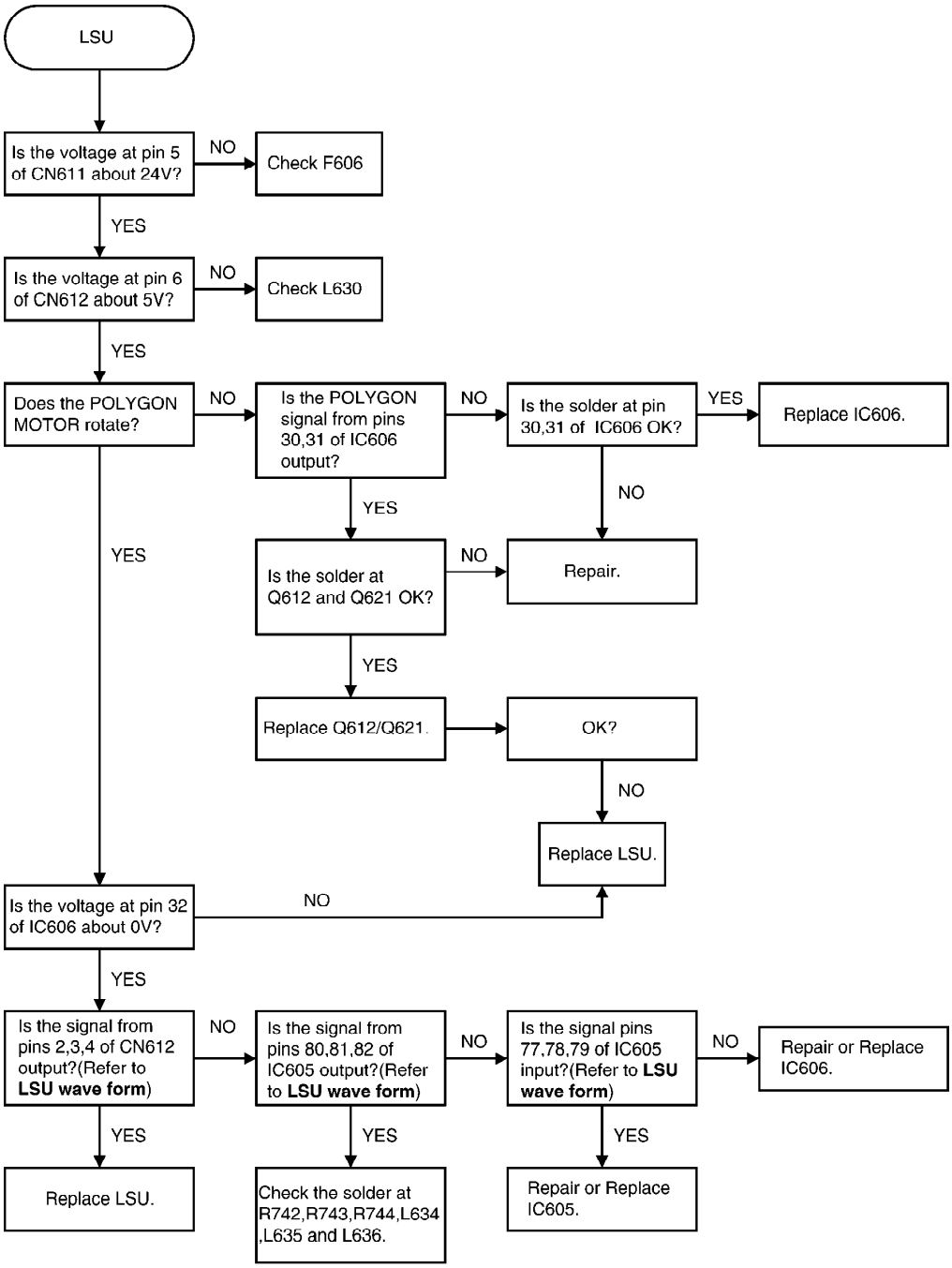
6.5.13.6.1. ENGINE MOTOR



6.5.13.6.2. ADF MOTOR



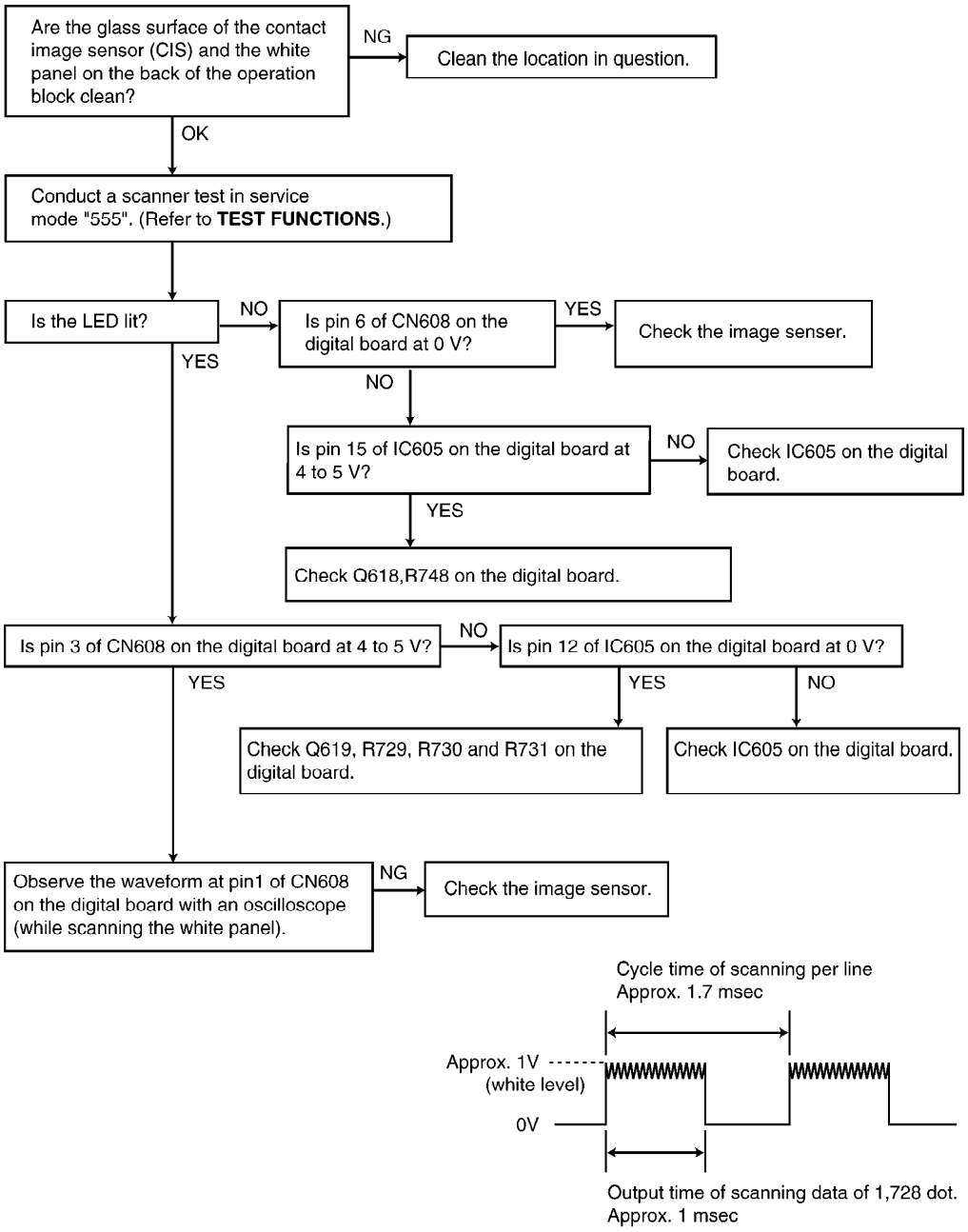
6.5.13.7. LSU SECTION



CROSS REFERENCE:

LSU (Laser Scanning Unit) SECTION ()

6.5.14. CIS (Contact Image Sensor) SECTION



CROSS REFERENCE:
TEST FUNCTIONS ()

6.5.15. HIGH VOLTAGE VALUE CHECK POINT

Measurement Procedure

1. Open the TOP cover.

2. Remove the developing unit, if it is equipped.

3. Open the TOP cover, and turn ON the TOP cover SW.

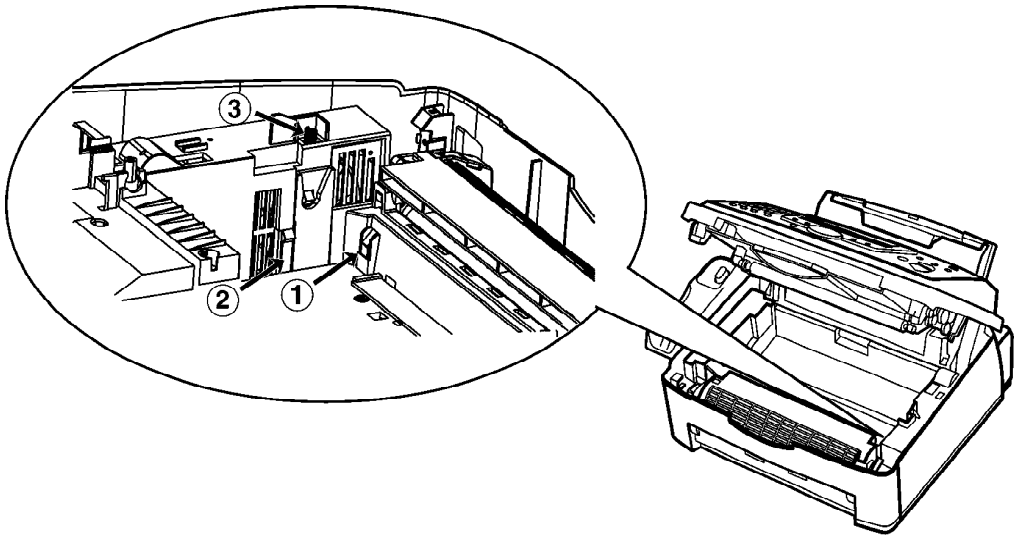
(Push the TOP cover SW with a sharp-tipped insulator or insert folded paper, etc. to the slit.)

4. **The unit enters the service mode when the TOP cover is open, then push *628.**
   (Don't push the START button.)
5. **Touch the output terminals under test with the high voltage probes.**
6. **Push the START button.**
   (This causes to output high voltage from each terminal, so be careful not to touch them. The sound “Pi Pi Pi” warns that the high voltage is outputting.)
7. **When the measurement is finished, push the STOP button.**
   (The high voltage output is stopped.)
8. **Repeat the items No. 5~7 until the measurement is finished.**
9. **When the measurement is finished, turn OFF the TOP cover SW.**

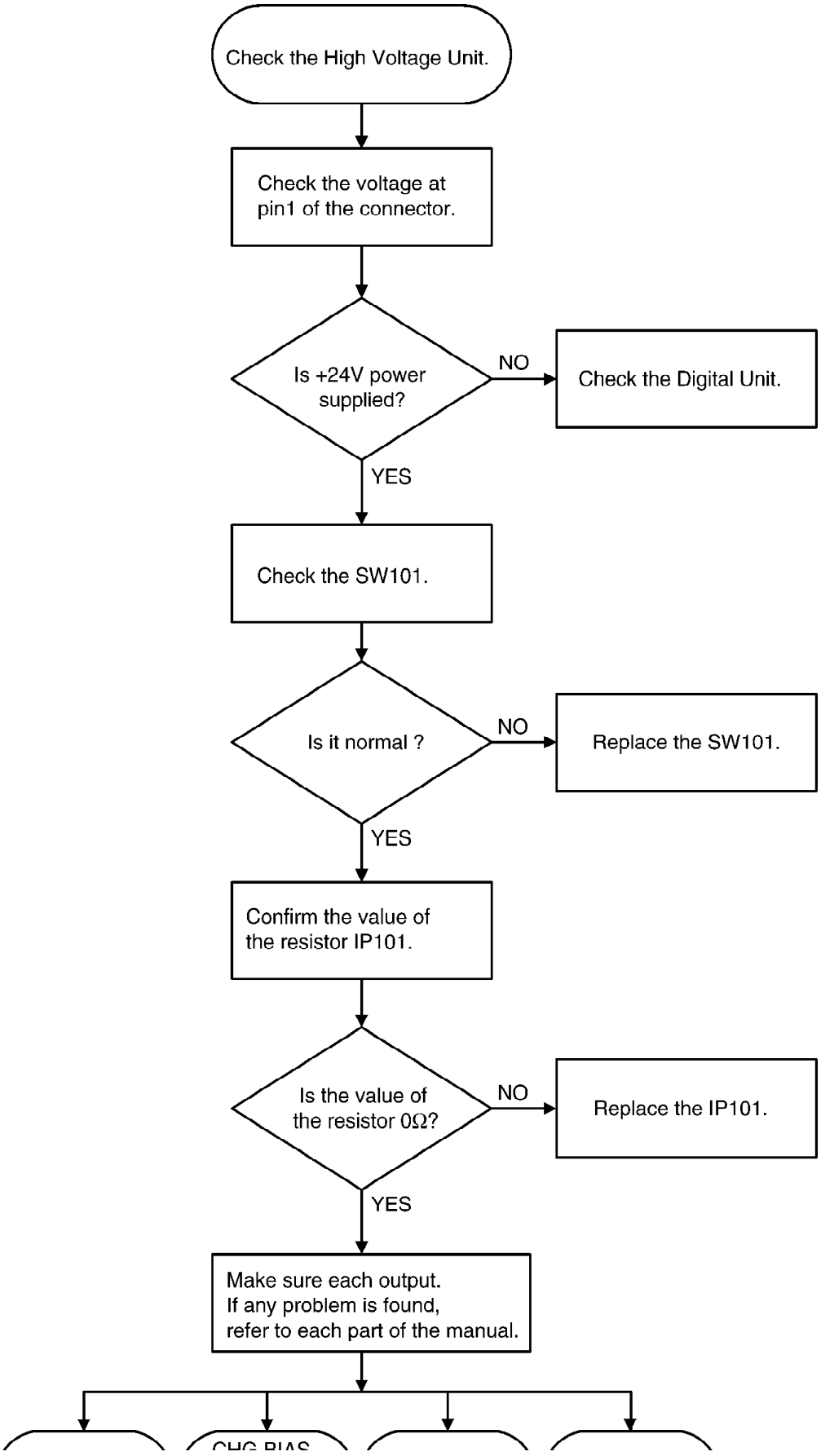
Output voltage of each terminal

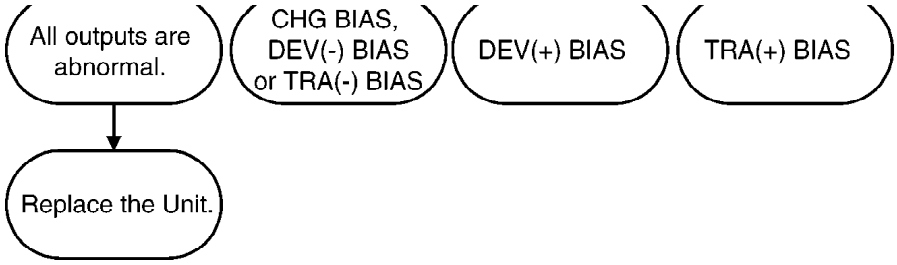
No.	BIAS Name	Specified output voltage	The range of specified output vo
①	CHG (Charge)	-1000V	-1000V± 30V
②	DEV (Developing)	-200V	-200V± 15V
③	TRA (Transfer)	-1000V	-1000V± 100V

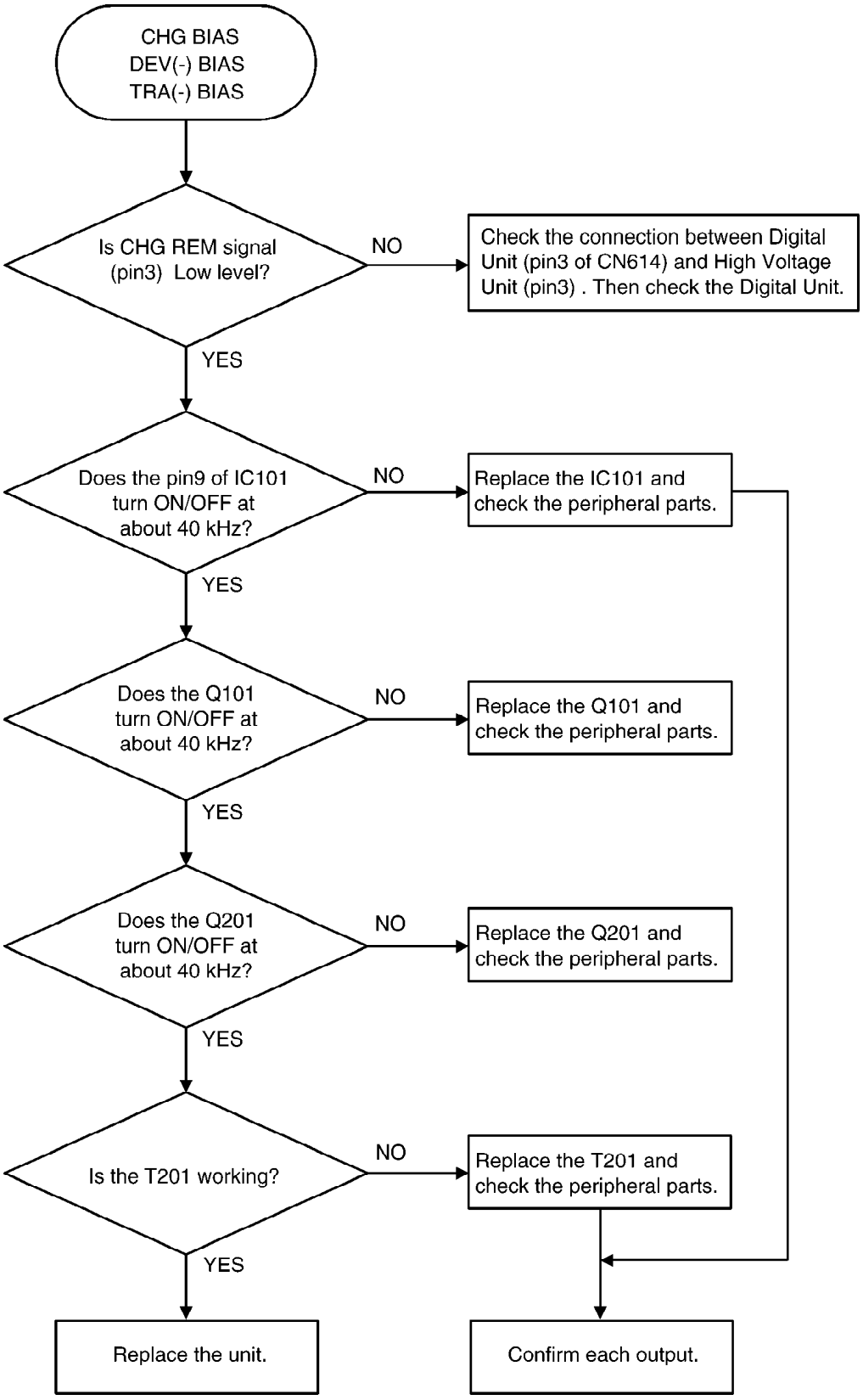
*** As for the High Voltage test equipment, FLUKE 85 (MULTI METER)+ HIOKI (HV PROBE 9014) or the equivalent should be used.**

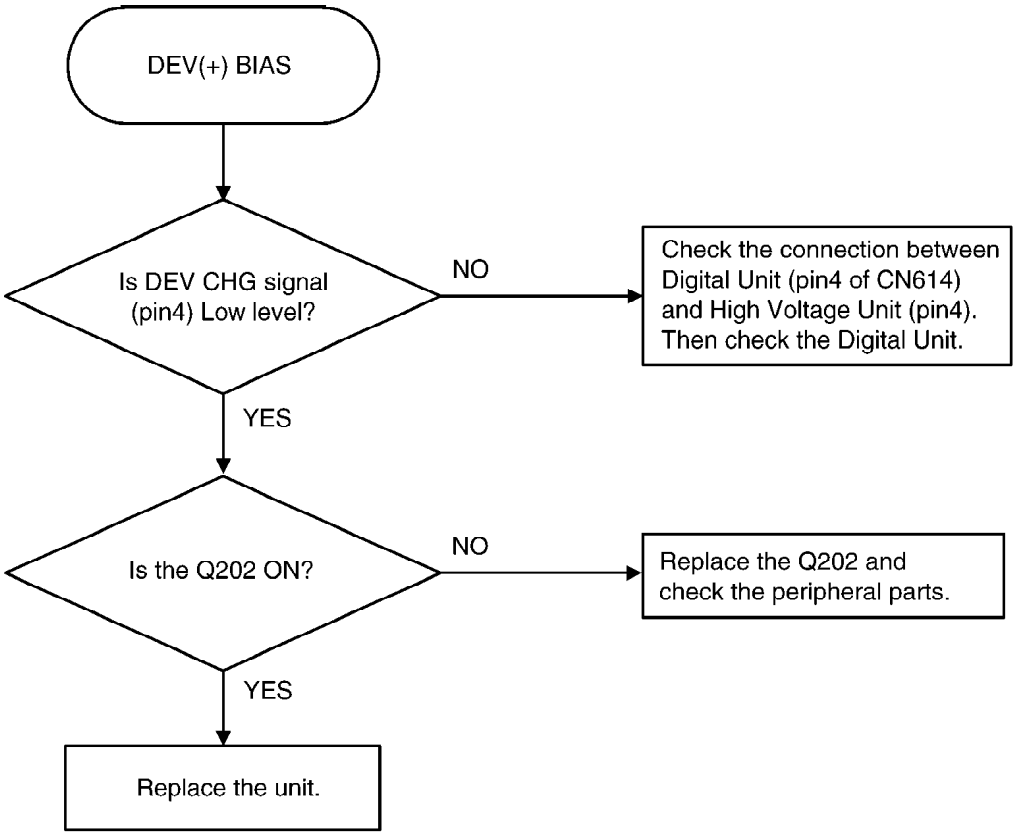


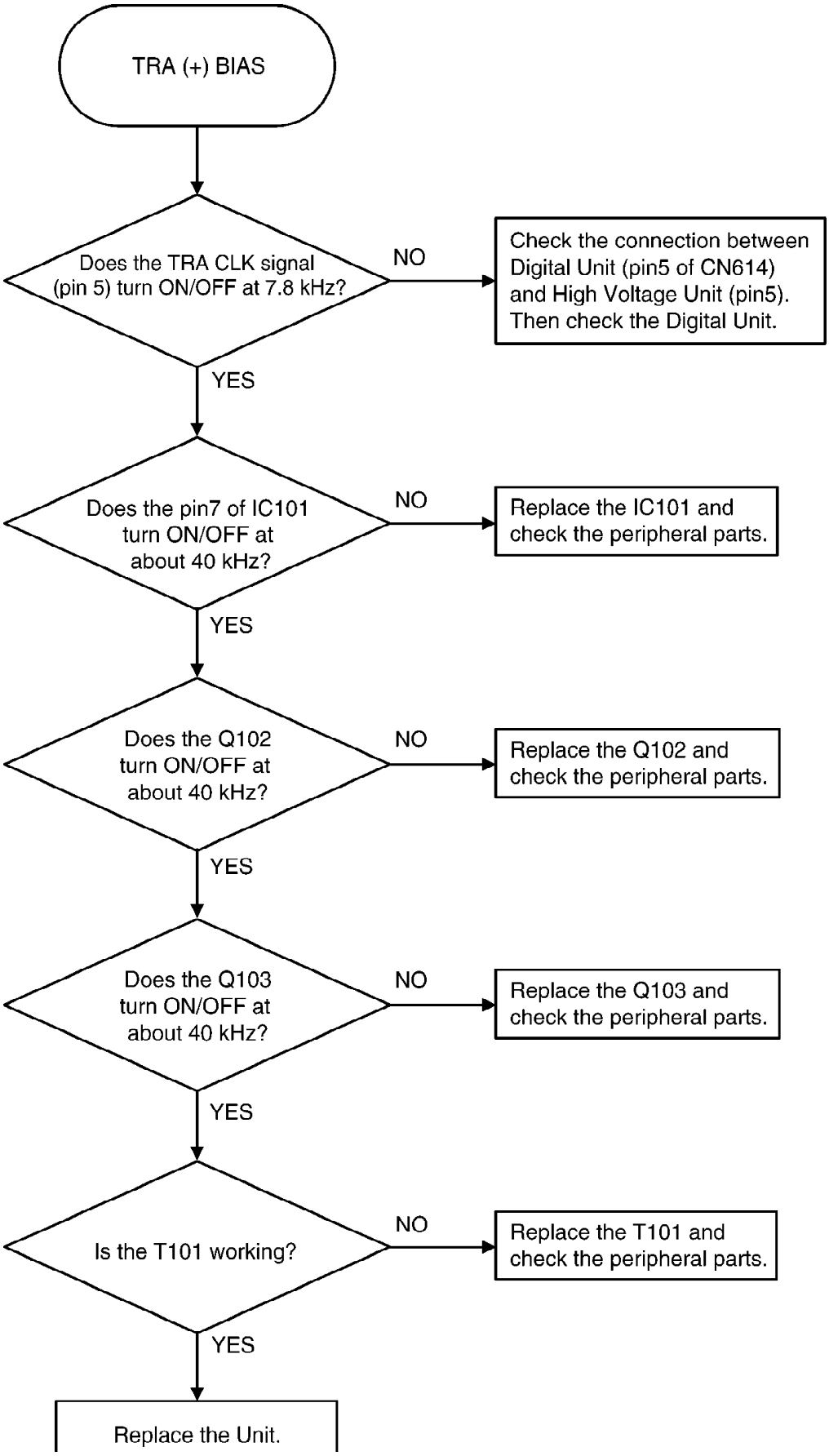
6.5.16. HIGH VOLTAGE SECTION


Check the High Voltage Unit.
Check the voltage at pin1 of the connector.
Is +24V power supplied?
NO
Check the Digital Unit.
YES
Check the SW101.
Is it normal ?
NO
Replace the SW101.
YES
Confirm the value of the resistor IP101.
Is the value of the resistor 0Ω?
NO
Replace the IP101.
YES
Make sure each output. If any problem is found, refer to each part of the manual.


All outputs are abnormal.
CHG BIAS, DEV(-) BIAS or TRA(-) BIAS
DEV(+) BIAS
TRA(+) BIAS
Replace the Unit.


CHG BIAS
DEV(-) BIAS
TRA(-) BIAS
Is CHG REM signal (pin3) Low level?
NO
Check the connection between Digital Unit (pin3 of CN614) and High Voltage Unit (pin3) . Then check the Digital Unit.
YES
Does the pin9 of IC101 turn ON/OFF at about 40 kHz?
NO
Replace the IC101 and check the peripheral parts.
YES
Does the Q101 turn ON/OFF at about 40 kHz?
NO
Replace the Q101 and check the peripheral parts.
YES
Does the Q201 turn ON/OFF at about 40 kHz?
NO
Replace the Q201 and check the peripheral parts.
YES
Is the T201 working?
NO
Replace the T201 and check the peripheral parts.
YES
Replace the unit.
Confirm each output.


DEV(+) BIAS
Is DEV CHG signal (pin4) Low level?
NO
Check the connection between Digital Unit (pin4 of CN614) and High Voltage Unit (pin4). Then check the Digital Unit.
YES
Is the Q202 ON?
NO
Replace the Q202 and check the peripheral parts.
YES
Replace the unit.


TRA (+) BIAS
Does the TRA CLK signal (pin 5) turn ON/OFF at 7.8 kHz?
NO
Check the connection between Digital Unit (pin5 of CN614) and High Voltage Unit (pin5). Then check the Digital Unit.
YES
Does the pin7 of IC101 turn ON/OFF at about 40 kHz?
NO
Replace the IC101 and check the peripheral parts.
YES
Does the Q102 turn ON/OFF at about 40 kHz?
NO
Replace the Q102 and check the peripheral parts.
YES
Does the Q103 turn ON/OFF at about 40 kHz?
NO
Replace the Q103 and check the peripheral parts.
YES
Is the T101 working?
NO
Replace the T101 and check the peripheral parts.
YES
Replace the Unit.



*** This Adjustment should be done with a single High Voltage Board.**
*** As for the High Voltage Probe, HV PROBE 9014 of HIOKI electric co. or the equivalent should be used.**
*** As for the tester, FLUKE 85 III multi meter or the equivalent should be used.**
*** Be careful not to touch the terminals during adjustment because the high voltage is used.**

6.5.17. POWER SUPPLY BOARD SECTION

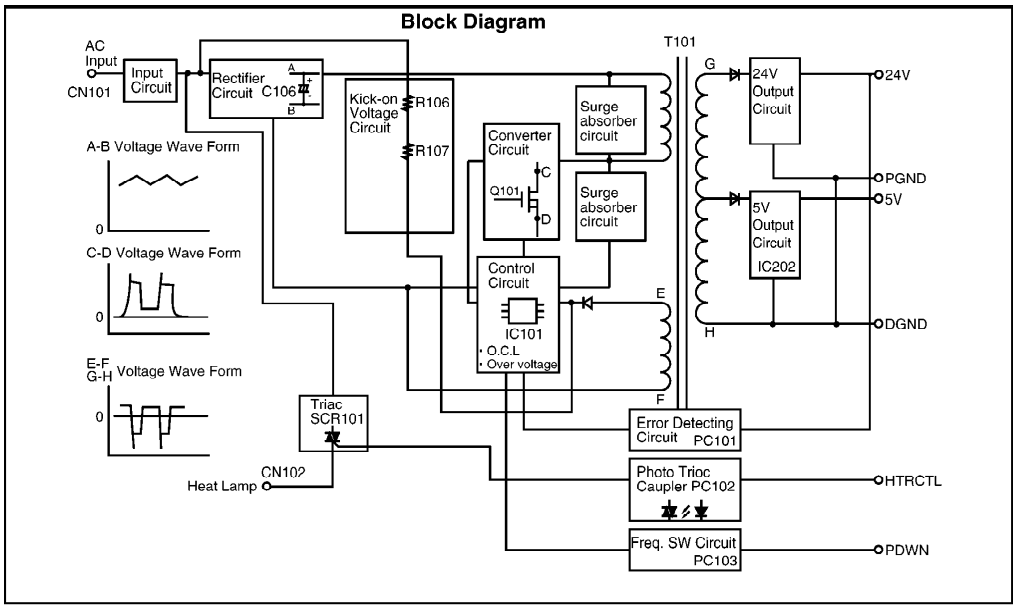
6.5.17.1. KEY COMPONENTS FOR TROUBLESHOOTING

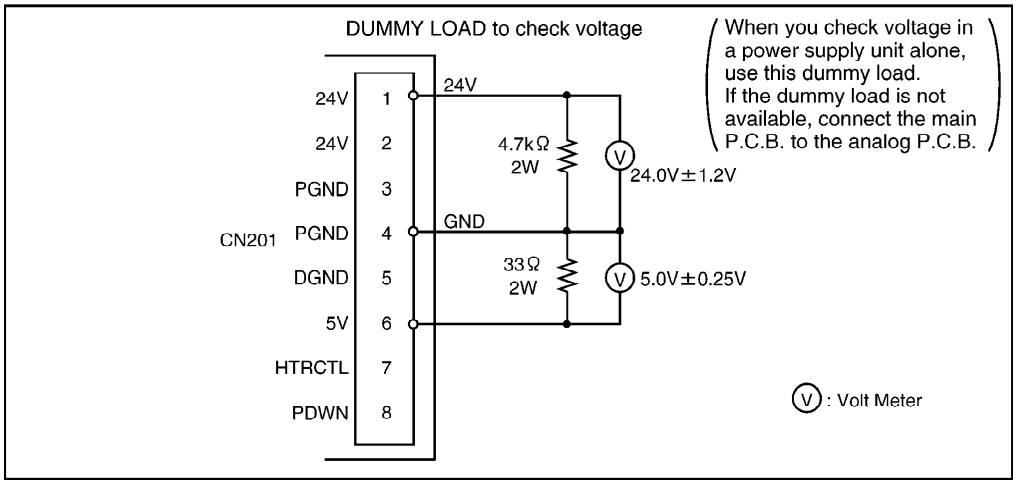
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

Caution:

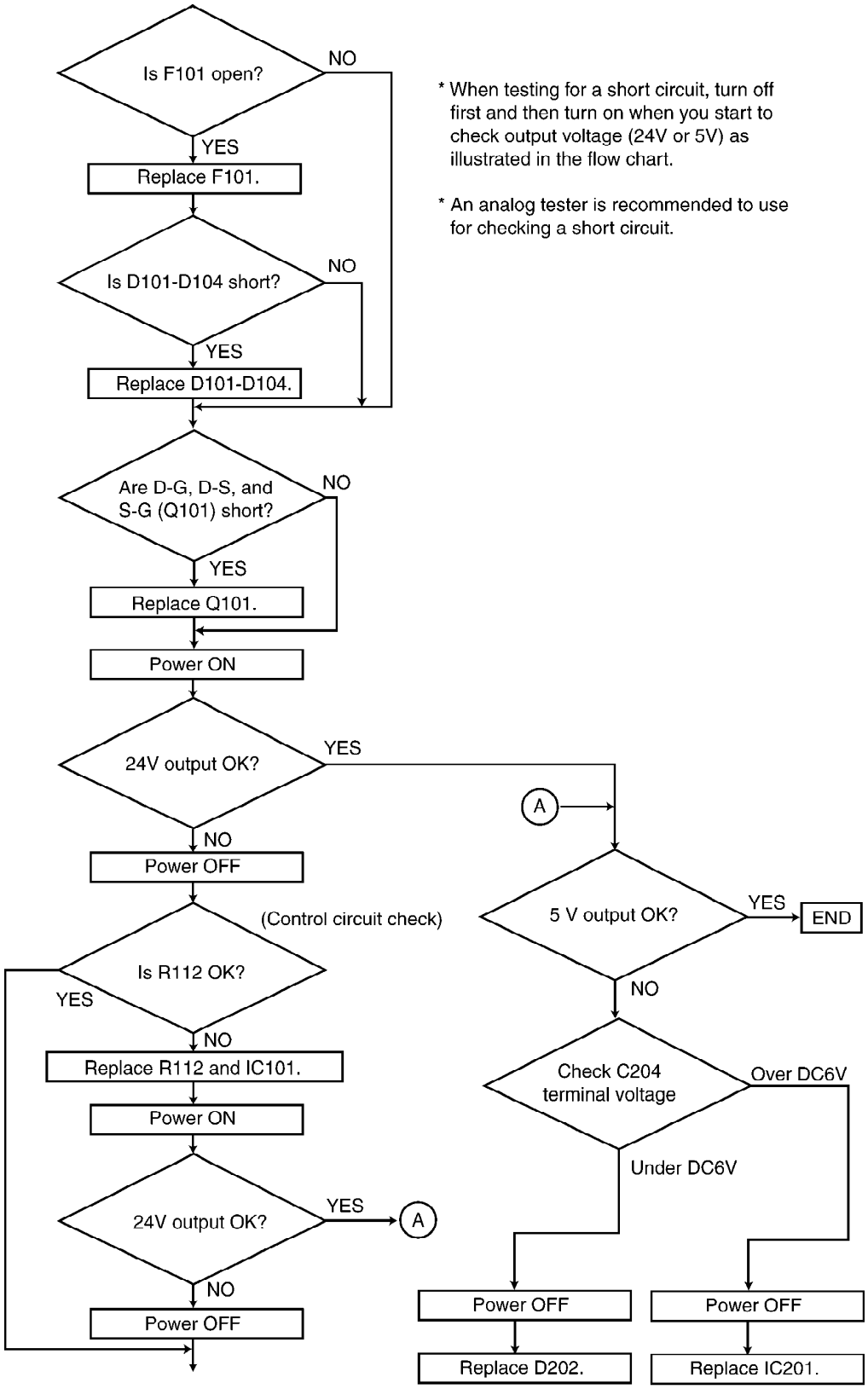
If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

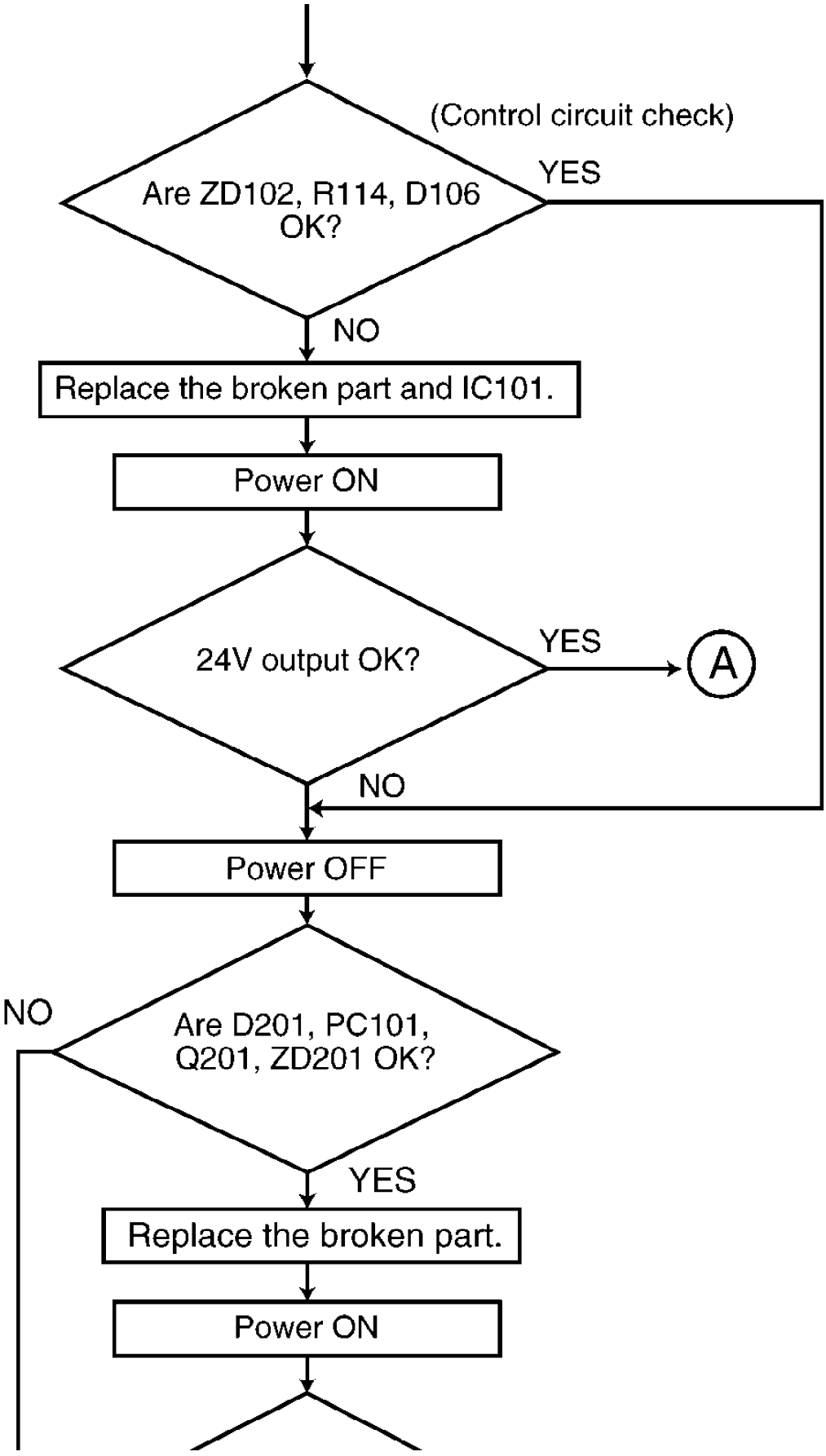
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.

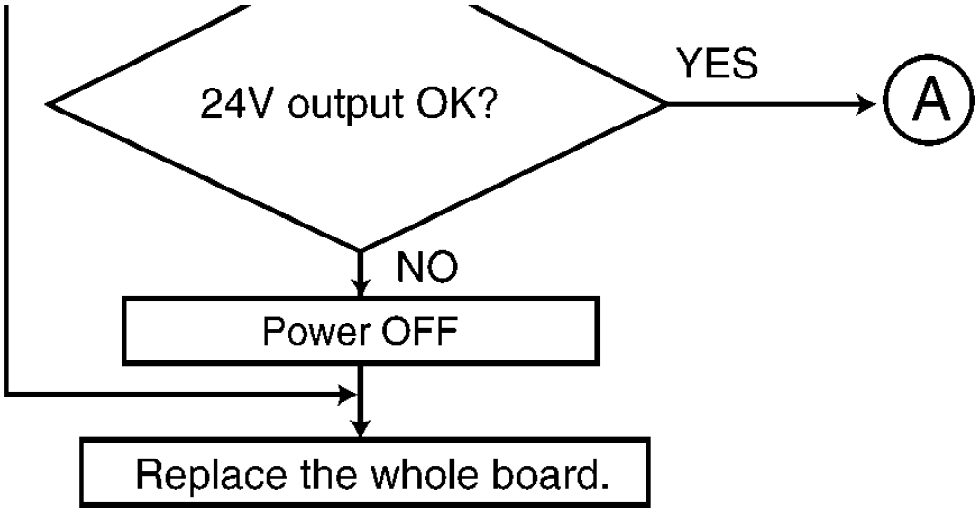




6.5.17.2. TROUBLESHOOTING FLOW CHART


Is F101 open?
NO
YES
Replace F101.
Is D101-D104 short?
NO
YES
Replace D101-D104.
Are D-G, D-S, and S-G (Q101) short?
NO
YES
Replace Q101.
Power ON
24V output OK?
YES
NO
Power OFF
(Control circuit check)
Is R112 OK?
YES
NO
Replace R112 and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
* When testing for a short circuit, turn off first and then turn on when you start to check output voltage (24V or 5V) as illustrated in the flow chart.
* An analog tester is recommended to use for checking a short circuit.
A
5 V output OK?
YES
END
NO
Check C204 terminal voltage
Over DC6V
Under DC6V
Power OFF
Replace D202.
Power OFF
Replace IC201.


(Control circuit check)
Are ZD102, R114, D106 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
NO
Are D201, PC101, Q201, ZD201 OK?
YES
Replace the broken part.
Power ON



6.5.17.3. BROKEN PARTS REPAIR DETAILS

(D101~D104)

Check for a short-circuit in terminal 4. If D101~D104 is short-circuit, F101 will melt (open).
In this case, replace all of the parts (D101~D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.
This is due to a very high voltage through the Gate circuit which is composed of R109 and IC101.
You should change all of the parts listed as follows.
F101, Q101, R109, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

7. CIRCUIT OPERATIONS

7.1. CONNECTION DIAGRAM

7.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board.

1. ASIC (IC606)

This custom IC is used for general FAX operations.

(1)	CPU:	This model uses a Z80 equivalent CPU operating at 16MHz. Many of the peripheral functions are handled by custom designed LSIs. As a result, the CPU only needs to process the results.
(2)	RTC:	Real time clock.
(3)	DECODER:	Decords the address.
(4)	ROM/RAM I/F:	Controls the SELECT signal of ROM or RAM and bank switching.
(5)	LSU I/F:	Controls the polygon motor and outputs the VIDEO signal to LSU.
(6)	I/O PORT:	I/O Port Interface.
(7)	ANALOG UNIT:	Sends beep tones,etc. Convert the analog signal to the digital signal.
(8)	MOTOR I/F:	Controls the SCAN Motor.

2. G/A (IC605)

(1) OPERATION PANEL I/F: Serial interface with Operation Panel.
(2) ANALOG GATE ARRAY I/F: Controls the ANALOG GATE ARRAY.
(3) MOTOR I/F: Controls the ENGINE Motor.
(4) FAN I/F: Controls FAN MOTOR and detect the rotation of FAN MOTOR.
(5) SENSOR I/F: Controls the LED and detect the sensor signal.
(6) I/O PORT: I/O Port Interface.

3. ROM (IC607)

This 64MB FLASH ROM contains all of the program instructions on the unit operations.

4. Synchronous Dynamic RAM (IC604)

This SDRAM is used for CPU work and receiving memory and page memory.

5. MODEM (IC600)

Performs the modulation and the demodulation for FAX communication.
Detects the CALLER ID signal.

6. Read Section

CIS image sensor to read transmitted documents.

7. LSU (Laser Scanning Unit)

Forms the images on the OPC drum by rotating polygon motor and reflecting the laser beam against polygon.

8. Analog Board

Composed of ITS circuit and NCU circuit.

9. Sensor Section

Composed of 4 switches and 5 sensors.

10. Power Supply Board Switching Section

Supplies +5V and +24V to the unit and controls the HEATER.

11. High Voltage Power Supply Board Section

Supplies bias need for the printing operation: bias of the DRUM, Developing and Transcription.

12. Fixing Unit

Composed heat lamp, thermistor and thermal fuse.

7.3. FACSIMILE SECTION

7.3.1. DIGITAL SECTION

7.3.1.1. DIGITAL BLOCK DIAGRAM

7.3.1.2. ASIC (IC606)

This custom IC is used for general FAX operations.

(1)	CPU:	This model uses a Z80 equivalent CPU operating at 16MHz. Many of the peripheral functions are handled by custom designed LSIs. As a result,the CPU only needs to process the results.
(2)	RTC:	Real time clock.
(3)	DECORDER:	Decodes the address.
(4)	ROM/RAM I/F:	Controls the SELECT signal of ROM or RAM and bank switching.
(5)	LSU I/F:	Controls the polygon motor and outputs the VIDEO signal to LSU.
(6)	I/O PORT:	I/O Port Interface.
(7)	ANALOG UNIT:	Sends beep tones,etc. Convert the analog signal to the digital signal.
(8)	MOTOR I/F:	Controls the SCAN Motor.

7.3.1.3. ROM (IC607)

This 64MB FLASH ROM contains all of the program instructions on the unit operations.

7.3.1.4. GATE ARRAY (IC605)

(1) OPERATION PANEL I/F: Serial interface with Operation Panel.
(2) ANALOG GATE ARRAY I/F: Controls the ANALOG GATE ARRAY.
(3) MOTOR I/F: Controls the ENGINE Motor.
(4) FAN I/F: Controls FAN MOTOR and detect the rotation of FAN MOTOR.
(5) SENSOR I/F: Controls the LED and detect the sensor signal.
(6) I/O PORT: I/O Port Interface.

7.3.1.5. SYNCHRONOUS DYNAMIC RAM (IC604)

This SDRAM is used for CPU work and receiving memory and page memory.

7.3.1.6. MODEM(IC600)

Performs the modulation and the demodulation for FAX communication.

Detects the CALLER ID signal.

Description of Pin Distribution (IC606)

PIN No.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
1	VSS	GND	GND	GND
2	VDD3.3A	PWR	3.3V	POWER SOURCE
3	AIN1	AI	3.3V	IMAGE DATA FROM CIS
4	AIN2	AI	3.3V	THERMISTOR ON FUSE UNIT
5	AIN3	AI	3.3V	THERMISTOR ON OPE UNIT
6	AMON	AO	3.3V	NOT USED
7	VSS	GND	GND	GND
8	X32OUT	O	3.3VBATT	RTC(32.768KHz)
9	X32IN	I	3.3VBATT	RTC(32.768KHz)
10	3.3VBATIN	I	3.3VBATT	POWER SOURCE(+3.3V/LITHIUM BATTERY)
11	XBACKEN	I	3.3VBATT	BACKUP ENABLE(CONNECT TO RESET LINE)
12	RESCS2/CLKE/ OP02	O	3.3VBATT	NOT USED
13	3.3VBATOUT	O	3.3VBATT	POWER SOURCE(+3.3V/LITHIUM BATTERY)
14	2.5VBATIN	I	2.5VBATT	POWER SOURCE(+2.5V/LITHIUM BATTERY)
15	XRESET	I	3.3V	RESET FOR INTERNAL CIRCUIT OF IC606
16	XORESET	O	3.3V	SYSTEM RESET OUTPUT
17	VSS	GND	GND	GND
18	VDD3.3V	PWR	3.3V	POWER SOURCE
19	XRESETI	I	3.3V	RESET INPUT
20	XWDERR	O	3.3V	WATCH DOG ERROR OUTPUT
21	TM0/IOP10	O	3.3V	TX MOTOR CONTROL
22	TM1/IOP11	O	3.3V	TX MOTOR CONTROL
23	TM2/IOP12	O	3.3V	TX MOTOR CONTROL
24	TM3/IOP13	O	3.3V	TX MOTOR CONTROL
25	TXE/IOP14	O	3.3V	TX MOTOR POWER CONTROL
26	VSS	GND	GND	GND
27	VDD2.5V	PWR	2.5V	POWER SOURCE
28	TRS/OP06	O	3.3V	TRANSFER BIAS CONTROL
29	HTRCTL	O	3.3V	HEATER CONTROL
30	POLCLK	O	3.3V	LSU CONTROL(POLYGON MOTOR CLOCK)
31	POLON	O	3.3V	LSU CONTROL(POLYGON MOTOR)
32	XREADY	I	3.3V	LSU CONTROL
33	XHSYNC	I	3.3V	LSU CONTROL

PIN No.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
34	LDON	O	3.3V	LSU CONTROL
35	APC	O	3.3V	LSU CONTROL
36	VIDEO	O	3.3V	LSU CONTROL(VIDEO SIGNAL)
37	XHSTRD/RBA[9]/ IP00	I	3.3V	ROM/RAM BAKN ADDRESS BUS 9
38	XHSTWR/RBA[10]/ IP01	I	3.3V	NOT USED
39	RESINT	I	3.3V	INTERRUPT FROM IC605
40	XRESCS1	O	3.3V	CHIP SELECT FOR IC605
41	RESCLK	O	3.3V	CLOCK FOR IC605
42	VSS	GND	GND	GND
43	VDD2.5V	PWR	2.5V	POWER SOURCE
44	XOUT	O	3.3V	SYSTEM CLOCK(24MHz)
45	XIN	I	3.3V	SYSTEM CLOCK(24MHz)
46	VSS	GND	GND	GND
47	VDD3.3V	PWR	3.3V	POWER SOURCE
48	IOP07	O	3.3V	OUTPUT PORT(FLASH WRITE PROTECT)
49	XCHKCS/ÇnÇo03	O	3.3V	NOT USED
50	XROMCS	O	3.3V	ROM(IC607) CHIP SELECT
51	XRD	O	3.3V	CPU RD
52	XWR	O	3.3V	CPU WR
53	DB0	I/O	3.3V	DATA BUS 0
54	DB1	I/O	3.3V	DATA BUS 1
55	DB2	I/O	3.3V	DATA BUS 2
56	DB3	I/O	3.3V	DATA BUS 3
57	DB4	I/O	3.3V	DATA BUS 4
58	DB5	I/O	3.3V	DATA BUS 5
59	DB6	I/O	3.3V	DATA BUS 6
60	DB7	I/O	3.3V	DATA BUS 7
61	DB8	I/O	3.3V	DATA BUS 8
62	DB9	I/O	3.3V	DATA BUS 9
63	DB10	I/O	3.3V	DATA BUS 10
64	VSS	GND	GND	GND
65	VDD2.5V	PWR	2.5V	POWER SOURCE
66	DB11	I/O	3.3V	DATA BUS 11
67	DB12	I/O	3.3V	DATA BUS 12
68	DB13	I/O	3.3V	DATA BUS 13
69	DB14	I/O	3.3V	DATA BUS 14
70	DB15	I/O	3.3V	DATA BUS 15
71	VDD5V	PWR	5V	POWER SOURCE
72	VSS	GND	GND	GND
73	VDD3.3V	PWR	3.3V	POWER SOURCE

PIN No.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
74	SDCS	O	3.3V	SDRAM(IC604) CHIP SELECT
75	RAS	O	3.3V	SDRAM(IC604) ROW ADDRESS STROBE
76	CAS	O	3.3V	SDRAM(IC604) COLUMN ADDRESS STROBE
77	SDWE	O	3.3V	SDRAM(IC604) WR SIGNAL
78	SDDQMU	O	3.3V	SDRAM(IC604) CONTROL
79	SDDQML	O	3.3V	SDRAM(IC604) CONTROL
80	VSS	GND	GND	GND
81	SDCLK	O	3.3V	SDRAM(IC604) CLOCK
82	VSS	GND	GND	GND
83	VDD3.3V	PWR	3.3V	POWER SOURCE
84	ADR0	O	3.3V	ADDRESS BUS 0
85	ADR1	O	3.3V	ADDRESS BUS 1
86	ADR2	O	3.3V	ADDRESS BUS 2
87	ADR3	O	3.3V	ADDRESS BUS 3
88	ADR4	O	3.3V	ADDRESS BUS 4
89	ADR5	O	3.3V	ADDRESS BUS 5
90	ADR6	O	3.3V	ADDRESS BUS 6
91	ADR7	O	3.3V	ADDRESS BUS 7
92	ADR8	O	3.3V	ADDRESS BUS 8
93	ADR9	O	3.3V	ADDRESS BUS 9
94	ADR10	O	3.3V	ADDRESS BUS 10
95	ADR11	O	3.3V	ADDRESS BUS 11
96	ADR12	O	3.3V	ADDRESS BUS 12
97	VSS	GND	GND	GND
98	VDD2.5V	PWR	2.5V	POWER SOURCE
99	RBA0	O	3.3V	ROM/RAM BAKN ADDRESS BUS 0
100	RBA1	O	3.3V	ROM/RAM BAKN ADDRESS BUS 1
101	RBA2	O	3.3V	ROM/RAM BAKN ADDRESS BUS 2
102	RBA3	O	3.3V	ROM/RAM BAKN ADDRESS BUS 3
103	RBA4	O	3.3V	ROM/RAM BAKN ADDRESS BUS 4
104	RBA5	O	3.3V	ROM/RAM BAKN ADDRESS BUS 5
105	RBA6	O	3.3V	ROM/RAM BAKN ADDRESS BUS 6
106	RBA7/OP04	O	3.3V	ROM/RAM BAKN ADDRESS BUS 7
107	RBA8/OP05	O	3.3V	ROM/RAM BAKN ADDRESS BUS 8
108	VDD3.3V	PWR	3.3V	POWER SOURCE
109	VSS	GND	GND	GND
110	EVOLIN	AI	3.3V	NOT USED
111	EVOLOUT	AO	3.3V	NOT USED
112	EVOLREF	AI	3.3V	NOT USED
113	TONE	AO	3.3V	TONE OUTPUT
114	XMDMCS	O	3.3V	MODEM(IC600) CHIP SELECT

PIN No.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
115	XMDMINT	I	3.3V	MODEM(IC600) INTERRUPT
116	CPC/IOP27	O	3.3V	NOT USED
117	ADR13/IOP15	O	3.3V	NOT USED
118	ADR14/IOP16	O	3.3V	NOT USED
119	ADR15/IOP17	O	3.3V	NOT USED
120	XNMI/XINT	I	3.3V	NOT USED
121	TEST1	I	3.3V	NOT USED
122	TEST2	I	3.3V	NOT USED
123	TEST3	I	3.3V	NOT USED
124	TEST4	I	3.3V	NOT USED
125	VDD2.5V	PWR	2.5V	POWER SOURCE
126	VSS	GND	GND	GND
127	F1	O	3.3V	CLOCK FOR CIS
128	FTG	O	3.3V	STROBE FOR CIS
129	TXD/IOP20	O	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
130	RXD/IOP21	I	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
131	RTS/IOP22	O	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
132	CTS/IOP23	I	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
133	DSR/IOP24	I	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
134	DTR/IOP25	O	3.3V	RS232C CONTROL(FOR SERVICE FUNCTION)
135	DCD/IOP26	O	3.3V	RESET FOR MODEM
136	ADSEL1	O	3.3V	CHANNEL SELECT FOR AIN
137	ADSEL2	O	3.3V	CHANNEL SELECT FOR AIN
138	VDD3.3V	PWR	3.3V	POWER SOURCE
139	VSS	GND	GND	GND
140	VDD2.5A	PWR	2.5V	POWER SOURCE
141	VREFB	AO	3.3V	STANDARD VOLTAGE FOR A/D
142	VCL	AO	3.3V	STANDARD VOLTAGE FOR A/D
143	VREFT	AO	3.3V	STANDARD VOLTAGE FOR A/D
144	VSSA	GND	GND	GND

Description of Pin Distribution (IC605)

PIN No.	SIGNAL	I/O	POWER SUPPLY VOLTAGE	EXPLANATION
1	VSS	0V	GND	GND
2	SENCTL2/IOP06	O	5V	NOT USED
3	SENCTL3/IOP07	I	5V	INPUT PORT(EX-HOOK)
4	SENIN0/IOP00	I	5V	INPUT FROM EXIT SENSOR
5	SENIN1/IOP01	I	5V	INPUT FROM REGIST SENSOR
6	SENIN2/IOP02	I	5V	INPUT PORT(BELL)
7	SENIN3/IOP03	I	5V	INPUT PORT(TNREMP)
8	IOP63/XCBUSY1	O	5V	NOT USED
9	IOP64/XCBUSY2	O	5V	NOT USED
10	IOP30(XHSYNC)	I	5V	INPUT PORT(XHSYNC)
11	IOP31	O	5V	NOT USED
12	IOP32	O	5V	OUTPUT PORT(CISON)
13	5V	5V	5V	POWER SOURCE
14	VSS	0V	GND	GND
15	IOP33	O	5V	OUTPUT PORT(CISLEDON)
16	IOP34	I	5V	INPUT PORT(DRUM)
17	IOP35	O	5V	OUTPUT PORT(PICKUP)
18	IOP36	O	5V	NOT USED
19	IOP37	O	5V	NOT USED
20	IOP40	O	5V	NOT USED
21	IOP41	O	5V	NOT USED
22	IOP42	O	5V	OUTPUT PORT(OPERST)
23	IOP43	O	5V	OUTPUT PORT(VOL0)
24	IOP44	O	5V	OUTPUT PORT(VOL1)
25	5V	5V	5V	POWER SOURCE
26	VSS	0V	GND	GND
27	MILAT/IOP10	O	5V	ANALOG ASIC CONTROL
28	MIDAT/IOP11	O	5V	ANALOG ASIC CONTROL
29	MICLK/IOP12	O	5V	ANALOG ASIC CONTROL
30	IOP45	O	5V	OUTPUT PORT(VOL2)
31	IOP46	O	5V	OUTPUT PORT(SPMUTE)
32	IOP47	O	5V	NOT USED
33	IOP50	I	5V	INPUT PORT(HOOK)
34	IOP51	O	5V	OUTPUT PORT(LEDCTL)
35	IOP52	I	5V	INPUT PORT(PAPER)
36	IOP53	O	5V	OUTPUT PORT(PDWN)
37	IOP54	I	5V	INPUT PORT(TOPCVR)
38	IOP55	O	5V	OUTPUT PORT(DEV)
39	IOP56	O	5V	OUTPUT PORT(CHG)
40	3.3V	3.3V	3.3V	POWER SOURCE
41	VSS	0V	GND	GND
42	DB0	I/O	3.3V	DATA BUS 0
43	DB1	I/O	3.3V	DATA BUS 1
44	DB2	I/O	3.3V	DATA BUS 2

44	DB2	I/O	3.3V	DATA BUS 2

PIN No.	SIGNAL	I/O	POWER SUPPLY VOLTAGE	EXPLANATION
45	DB3	I/O	3.3V	DATA BUS 3
46	DB4	I/O	3.3V	DATA BUS 4
47	DB5	I/O	3.3V	DATA BUS 5
48	DB6	I/O	3.3V	DATA BUS 6
49	DB7	I/O	3.3V	DATA BUS 7
50	3.3V	3.3V	3.3V	POWER SOURCE
51	VSS	0V	GND	GND
52	ADR0	I	3.3V	ADDRESS BUS 0
53	ADR1	I	3.3V	ADDRESS BUS 1
54	ADR2	I	3.3V	ADDRESS BUS 2
55	ADR3	I	3.3V	ADDRESS BUS 3
56	ADR4	I	3.3V	ADDRESS BUS 4
57	ADR5	I	3.3V	ADDRESS BUS 5
58	ADR6	I	3.3V	ADDRESS BUS 6
59	TEST0	I	5V	NOT USED
60	TEST1	I	5V	NOT USED
61	XWR	I	3.3V	WR SIGNAL
62	XRD	I	3.3V	RD SIGNAL
63	3.3V	3.3V	3.3V	POWER SOURCE
64	VSS	0V	GND	GND
65	CLK	I	3.3V	CLOCK INPUT
66	VSS	0V	GND	GND
67	XRESET	I	3.3V	RESET INPUT
68	XCS	I	3.3V	CHIP SELECT INPUT
69	INT	O	3.3V	INTERRUPT INPUT
70	KSTART	O	3.3V	OPERATION PANEL CONTROL
71	KLATCH/OP24/ SENCTL3	O	3.3V	NOT USED
72	KSCLK	O	3.3V	OPERATION PANEL CONTROL
73	KTXD	I/O	3.3V	OPERATION PANEL CONTROL
74	KRXD/IP23/SENIN3	I	3.3V	INPUT FROM READ POSITION SENSOR
75	3.3V	3.3V	3.3V	POWER SOURCE
76	VSS	0V	GND	GND
77	VIN0/IP20(APC)	I	3.3V	INPUT TO INVERTER
78	VIN1/IP21	I	3.3V	INPUT TO INVERTER
79	VIN2/IP22	I	3.3V	INPUT TO INVERTER
80	VOUT0/OP25	O	5V	OUTPUT FROM INVERTER
81	VOUT1/OP26	O	5V	OUTPUT FROM INVERTER
82	VOUT2/OP27	O	5V	OUTPUT FROM INVERTER
83	RM0	O	5V	RX MOTOR CONTROL
84	RM1	O	5V	RX MOTOR CONTROL
85	RM2	O	5V	RX MOTOR CONTROL
86	RM3	O	5V	RX MOTOR CONTROL

PIN No.	SIGNAL	I/O	POWER SUPPLY VOLTAGE	EXPLANATION
87	RXE	O	5V	NOT USED
88	5V	5V	5V	POWER SOURCE
89	VSS	0V	GND	GND
90	IOP57	O	5V	NOT USED
91	FANDET1/IOP14	I	5V	DETECT FAN ROTATION
92	FANON1/IOP15	O	5V	FAN CONTROL
93	FANDET2/IOP16	O	5V	OUTPUT PORT(BREAK)
94	FANON2/IOP17	O	5V	FAN CONTROL
95	IOP60/CSI	O	5V	NOT USED
96	IOP61/CCLK	O	5V	OUTPUT PORT(RLY)
97	IOP62/CSO	I	5V	INPUT PORT(VOX)
98	SENCTL0/IOP04	O	5V	LED CONTROL FOR EXIT SENSOR
99	SENCTL1/IOP05	O	5V	LED CONTROL FOR REGIST SENSOR
100	5V	5V	5V	POWER SOURCE

7.3.2. RTC BACKUP CIRCUIT

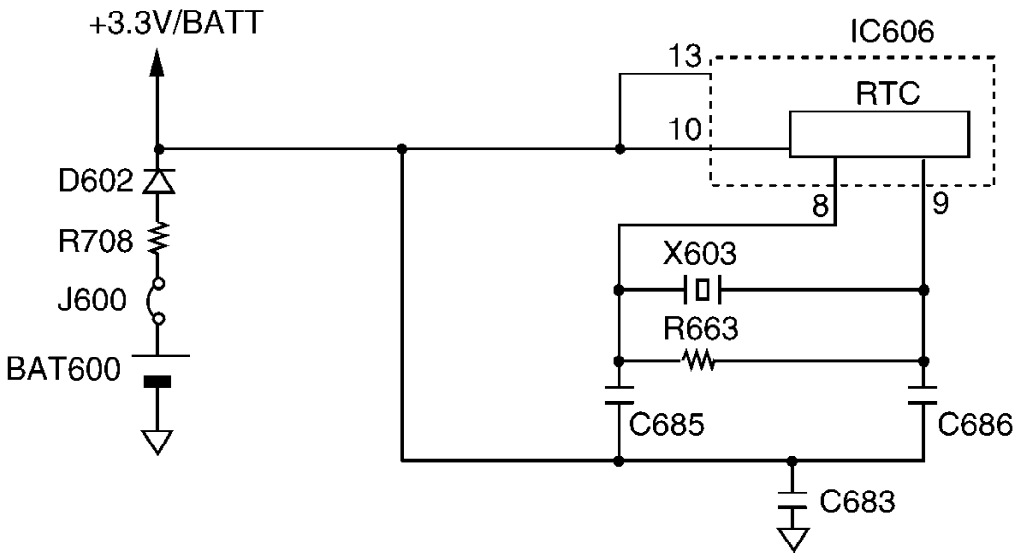
1. Function

This unit has a lithium battery (BAT600) which works for the Real Time Clock IC (RTC: inside IC606).
The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

2. RTC Inside (IC606) Backup Circuit Operation

When the power switch is turned ON, power is supplied to the RTC (inside IC606). At this time, the voltage at pin 10 of the IC606 is +3.3V. When the power switch is turned OFF, the BAT600 supplies power to RTC through D602. The voltage at pin 10 of IC606 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 10 of RTC (IC606) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram



7.3.3. MODEM CIRCUIT OPERATION

The modem (IC600) has all the hardware satisfying the CCITT standards mentioned previously. When the ASIC IC606 (114) is brought to a low level, the modem (IC600) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC606) ADR0-ADR4(pin 84~88). Commands are written through the data bus, and all processing is controlled by the ASIC (IC606) according to CCITT procedures. Here, the INT signal dispatched from IRQ (pin 79 of IC600) to the ASIC (IC606) implements post processing.
This modem (IC600) has an automatic application equalizer. With training signal 1 or 2 at the time of G3 reception, it can automatically establish the optimum equalizer. The modem (IC600) operates using the 28.224MHz clock (X801).

1. Facsimile Transmission/DTMF Line Send

The digital image data on the data bus is modulated in the modem (IC600), and sent from pin 28 and 29 via modem IC600, ampligier IC205(5,6 → 7), Analog gate array IC207(24 → 22), amplifier IC204(6 → 7) and the NCU section to the telephone line.
Refer to CHECK SHEET().

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 32 of the modem (IC600). The signals that enter pin 32 of the modem (IC600) are demodulated in the board to digital image signals, then placed on the data bus.
In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image

signals to a long-distance receiving level.
This is designed to correct the characteristics of the frequency band centered around 3 kHz and maintain a constant receiving sensitivity.
It can be set in the service mode.
Refer to CHECK SHEET().

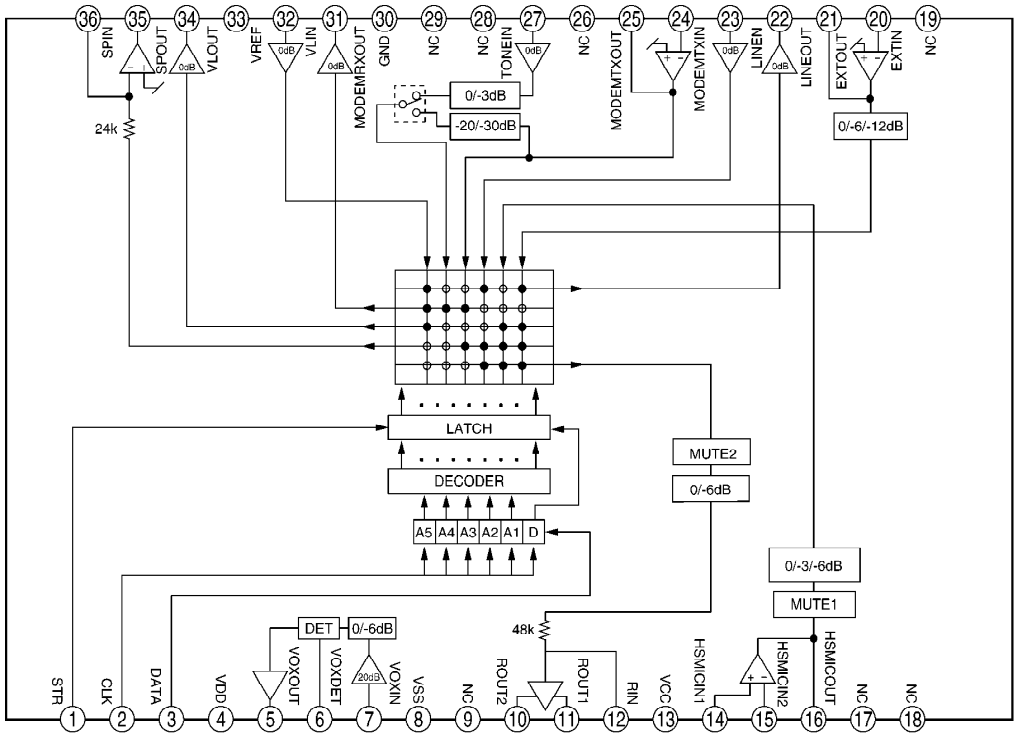
3. DTMF Transmission (Monitor tone)
   The DTMF signal generated in the modem (IC600) is output from pin 28,29, and the NCU section to the telephone line the same as facsimile transmission signals.
   (DTMF Monitor Tone)
   Refer to CHECK SHEET().
4. Busy/Dial Tone Detection
   The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC600) becomes 1, and this status is monitored by ASIC (IC606).
5. Call Tone Transmission
   This is the call signal which is generated the ASIC (IC606) and sent to the speaker.

7.3.4. ANALOG SECTION

Composed of ITS circuit and NCU circuit.

7.3.4.1. ANALOG GATE ARRAY (IC207)

The cross-point switch installed in this IC makes it possible to change the circuit configuration for any analog signals such as the fax signals sent from the digital board. In addition, this analog gate array integrates a handset circuit, input/output ports, etc.
This IC is controlled by ASIC(IC606) through GATE ARRAY (IC605) on the digital board.



Explanation of ANALOG GATE ARRAY (IC207 on the ANALOG Board)

No.	Name	Function	No.	Name	Function
1	STR	Strobe input	19	NC	Not used
2	CLOCK	Clock input	20	EXTIN	Ext amp output
3	DATA	Data input	21	EXTOUT	Ext amp input
4	VDD	Logic power supply	22	LINEOUT	Line amp output
5	VOXOUT	VOX output	23	LINEIN	Line amp input
6	VOXDET	VOX detection adjustment	24	MODEMTXIN	MODEM TX amp input
7	VOXIN	VOX input	25	MODEMTXOUT	MODEM TX amp output
8	VSS	Logic ground	26	NC	Not used
9	NC	Not used	27	TONEIN	Tone amp input
10	ROUT2	HS receiver amp output 2	28	NC	Not used
11	ROUT1	HS receiver amp output 1	29	NC	Not used
12	RIN	HS receiver amp input	30	GND	Analog ground
13	VCC	Analog ground	31	MODEMRXOUT	MODEM RX amp output
14	HSMICIN1	HS mic amp input 1	32	VLIN	Volume amp input
15	HSMICIN2	HS mic amp input 2	33	VREF	Reference voltage output
16	HSMICOUT	HS mic amp output	34	VLOUT	Volume amp output
17	NC	Not used	35	SPOUT	Speaker amp output
18	NC	Not used	36	SPIN	Speaker amp input

7.3.4.2. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. Function

The analog section works as an interface between the telephone line.
The analog ASIC (IC207) on the analog board exchanges FAX TX and RX signals between the MODEM (IC600) and the analog section.
The control signals transmitted to the analog section are output mainly from G/A IC605, and the analog status is stored as data in G/A IC605.

2. Circuit Operation
[NCU]: Network Control Unit the NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detection circuit; Side tone circuit; Remote fax activation circuit. Refer to NCU SECTION () for the details.

7.3.4.3. BLOCK DIAGRAM

7.4. NCU SECTION

7.4.1. GENERAL

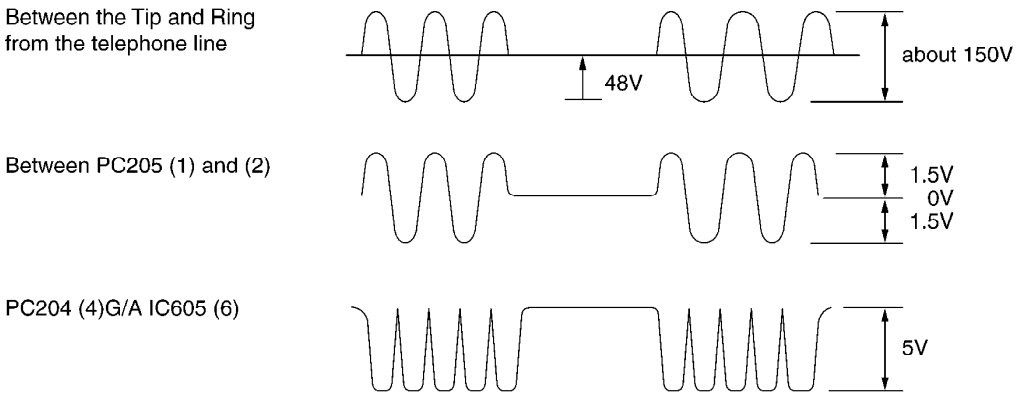
This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL line relay (RLY200), bell detection circuit, TAM interface circuit, line amplifier and side tone circuits and a multiplexer.

7.4.2. EXT. TEL. LINE RELAY (RY200)

1. Circuit Operation
Normally, this relay switches to the external telephone side (break) and switches to the open side (make) while OFF-HOOK.
{ IC605 (95) High Level → CN600 (27) High Level} → CN201 (2) High Level → Q212 ON → RY200 (ON) → (make)

7.4.3. BELL DETECTION CIRCUIT

1. Circuit Operation
The signal waveform for each point is indicated below. The signal (low level section) input to pin 6 of gate array IC605 on the digital board is read by ASIC and judged as a bell.
TEL LINE → PC205 (1, 2 - 4) → IC605 (6)



7.4.4. CALLING LINE IDENTIFICATION CIRCUIT

1. Function

This unit is compatible with the Caller ID service offered by your local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data “0” is a 1200 Hz sine wave, and data 1 a 2200 Hz sine wave.

There are two type of the message format which can be received: i.e.the single data message format and multiple data message format.

The multiple data format allows to transmit the name and data code information in addition to the time and telephone number data.

When there is multiple data in the unit, the name or telephone number are displayed.

2. Circuit Operation

The caller ID signal input from TEL LINE is processed with MODEM (IC600).

Refer to CHECK SHEET () for the route of caller ID signal.

7.4.5. LINE AMPLIFIER AND SIDE TONE CIRCUIT

1. Circuit Operation

The reception signal output from the line transformer T200 is input to pin (2) of IC204 via C232, R236 and then the signal is amplified at pin (1) of IC204 and sent to the reception system.

The transmission signal goes through C224, R232 and enters IC204-pin (6), where the signal is amplified. Then, it is output from pin (7) of IC204 and transmitted to T200 via, C237, R243. Without a side tone circuit, the transmission signal will return to the reception amplifier via R236, C232. When the side tone circuit is active, the signal output from IC204 pin (7) passes through C237, R241, R233, C225, C223, and R229 and goes into the amplifier IC204 pin (3). This circuit is used to cancel the transmission return signal.
The TX signal is output to the circuit analog the route from the IC204 7 pin → C237 → R243 → T200 → TEL LINE.
However, if balance is lost in the bridge, a voltage occurs between the IC204 2 pin and 3 pin and a side tone results, because the balance cannot be maintained completely at all frequencies in the audio range some side tone always occur.

7.4.6. REMOTE FAX ACTIVATION CIRCUIT

1. Function

Another telephone connected to same line activates the unit to the FAX mode by using a DTMF signal.

2. Signal Path

Refer to CHECK SHEET ().

7.4.7. TAM INTERFACE CIRCUIT

This circuit is to switch between FAX receiving and the external TAM's message recording automatically. This circuit consists of an EXT.TAM OFF-HOOK detect circuit, transformer, amplifier, Analog ASIC and MODEM.
For details, please refer to TAM INTERFACE SECTION ().

7.5. ITS (Integrated telephone System) and MONITOR SECTION

7.5.1. GENERAL

The general ITS operation is performed by the special IC207 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC606 (digital board).

7.5.1.1. TELEPHONE MONITOR

1. Function

This is the function when you are not holding the handset and can hear the caller's voice from the line.

2. Circuit Operation
(Telephone Monitor Signal Path)
Signals received from the telephone line are output through at the speaker via the following path.

3. Signal Path
Refer to CHECK SHEET.

7.5.1.2. HANDSET CIRCUIT

1. Function
This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal Path (Transmission signal)
Refer to CHECK SHEET.

3. Signal path (Reception signal)
Refer to CHECK SHEET.

7.5.1.3. MONITOR CIRCUIT

1. Function
This circuit monitors various tones, such as (1) DTMF tone, (2) Alarm/Beep/Key tone/Bell.

2. Signal Path
A. DTMF MONITOR
(Speaker Operation)
Refer to CHECK SHEET.
(Handset Operation)
Refer to CHECK SHEET.
B. ALARM/BEEP/KEY TONE/BELL
Refer to CHECK SHEET.

7.5.1.4. TAM INTERFACE SECTION

1. Function
When TAM is connected to this unit, the unit receives documents for FAX calls or the external TAM records a voice message automatically.

2. Circuit Operation
The TAM INTERFACE circuit consists of an EXT.TAM HOOK detection circuit (PC206), and transformer (T200), amplifier (IC204)

analog ASIC (IC207), MODEM (IC600) to detect the other party CNG signal, and RLY200 to separate EXT.TAM.

A. EXT. TAM HOOK detection circuit

A bell is received at EXT. TAM and EXT. TAM is connected to the line, making a DC LOOP. Then, PC206 detects this voltage. During detection, PC206 (4) becomes low.

(DC LOOP)

Tip → F200 → L239 → L248 → T1 → R1 → L247 → RLY200 → PC206(2-1) → L242 → POS200 → Ring

B. CNG signal detection circuit

The CNG signal from the other party's FAX is detected in MODEM IC600 (digital board).

(Signal path)

Refer to CHECK SHEET().

C. Remote receiving

This is the parallel-connected DTMF signal for the TEL or EXT.TEL mode between T and R. When the other party is a FAX, the unit switches to FAX receiving.

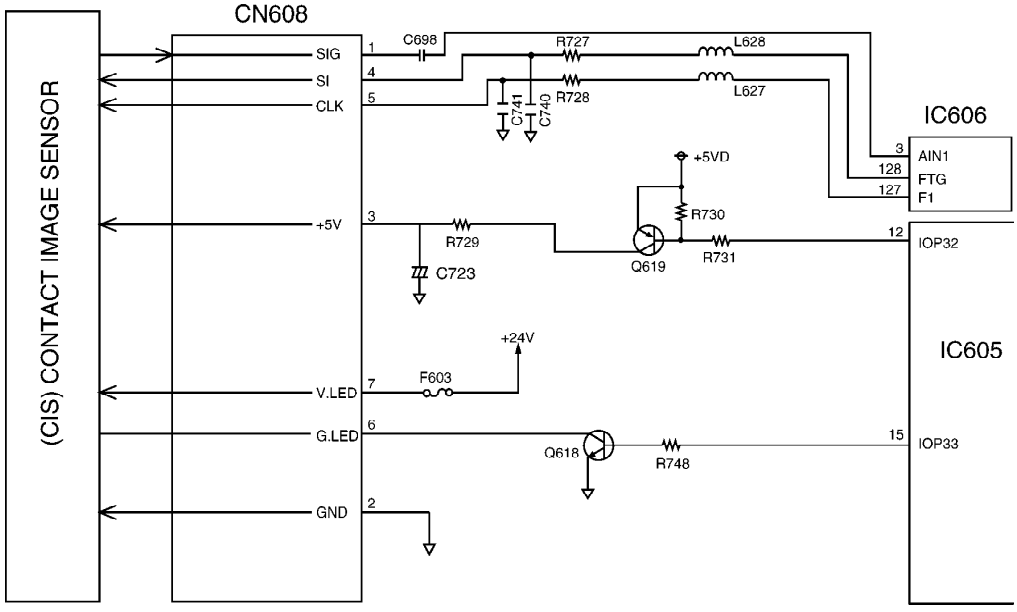
(Signal Path)

Refer to CHECK SHEET().

7.6. CIS CONTROL SECTION

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED, a light guide, and photoelectric conversion elements.

Circuit Diagram



When an original document is inserted and the start button pressed, pin 15 of IC605 goes to a high level and the transistor Q618 turns on.This applies voltage to the LED to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC606, and the original image illuminated by the LED undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system ASIC on AIN1 (pin 3 of IC606) and converted into 8-bit data by the A/D converter inside IC606. Then this signal undergoes digital processing in order to obtain a high-quality image.

7.7. STEPPING MOTOR DRIVE SECTION

7.7.1. ENGINE MOTOR DRIVE CIRCUIT

1. Functions

This motor functions for main operations FAX reception and copy printing.

This feed recording paper synchronized for printing.

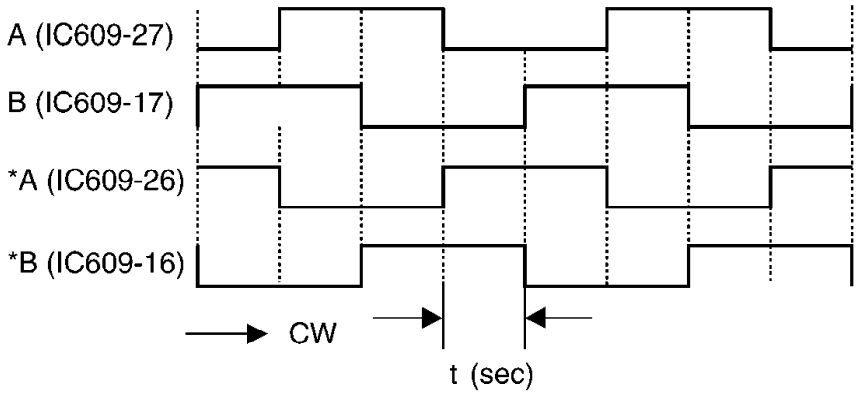
2. Motor operation

Excitation pulses is output from G/A (IC605) pins 83, 84, 85 and 86. Then stepping pulses are output from driver IC (IC609) pin No 2, 7, 8 and 13, and drives the motor coil.

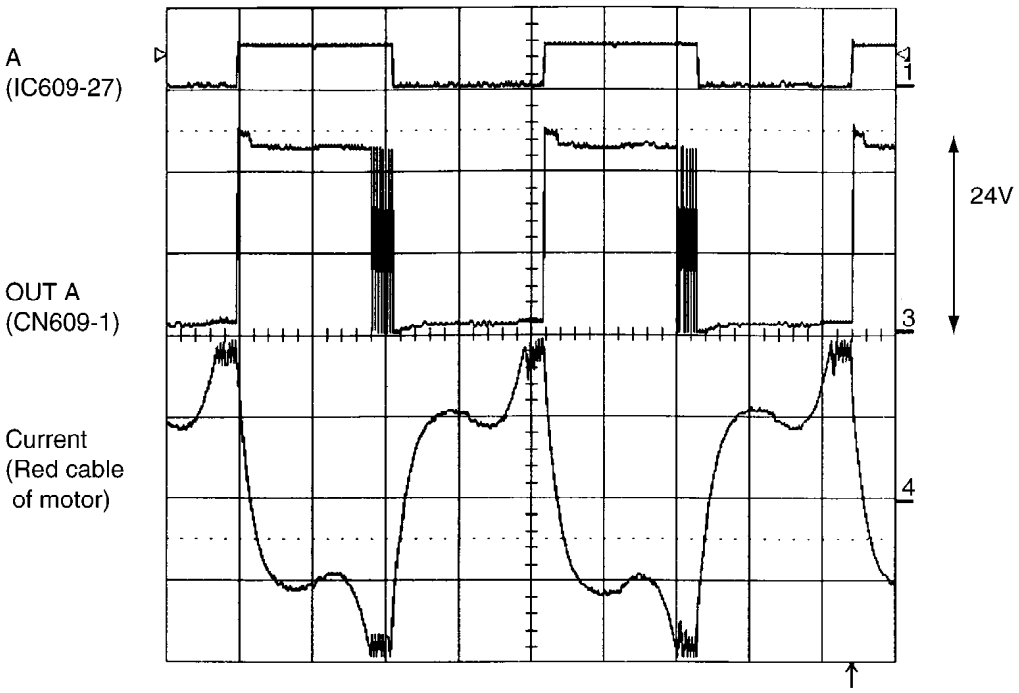
During motor driving, pin 90 of G/A IC605 becomes a low level. As a result, a current of about 1A are supplied to the motor coil.

7.7.1.1. TIMING CHART

① 2 phase excitation



② 2 phase excitation output waveform (example "A Phase")

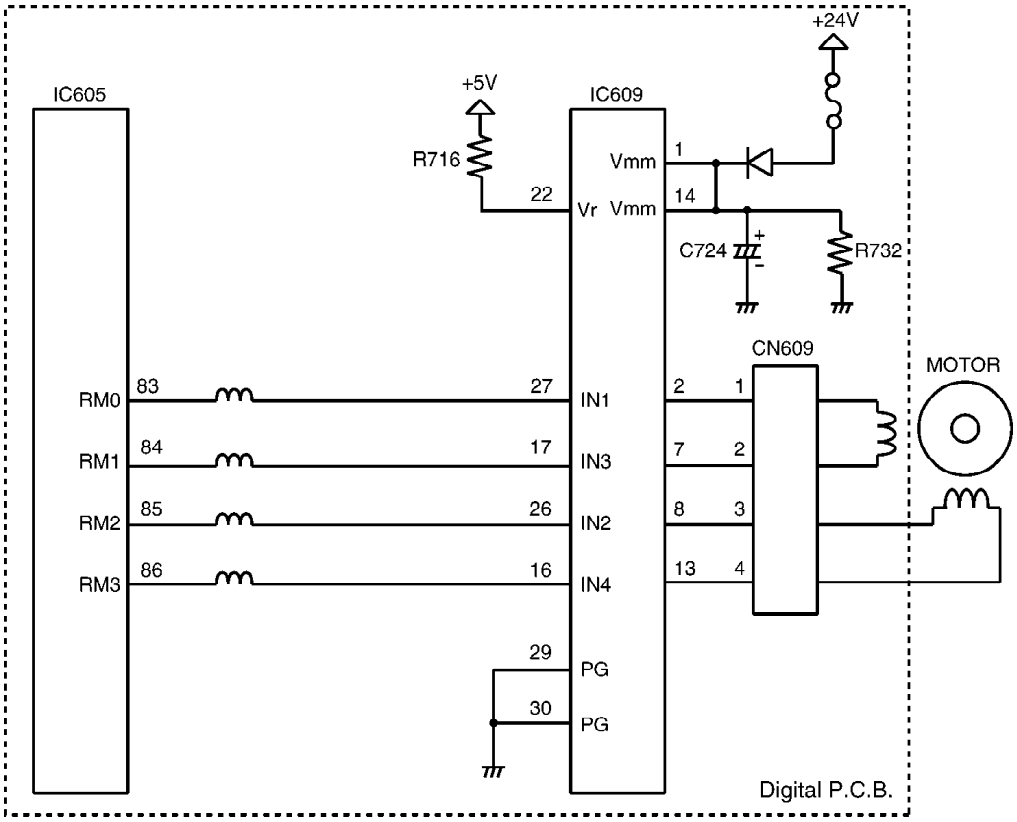


Other phase (B, *A, *B) operates as A phase does.

DRIVE MODE

FUNCTION	MODE	PHASE PATTERN	SPEED	CURREN
PRINT	-	2 phase	951pps	1A

7.7.1.2. ENGINE MOTOR DRIVE CIRCUIT



7.7.2. SCAN MOTOR DRIVE CIRCUIT

1. Functions

This motor functions for main operations including FAX transmission.

This feed document paper synchronized for reading.

2. Motor operation

During motor driving, pin 25 of ASIC IC606 becomes a high level, and Q613, Q620 turns ON.

As a result, +24V is supplied to the motor coil.

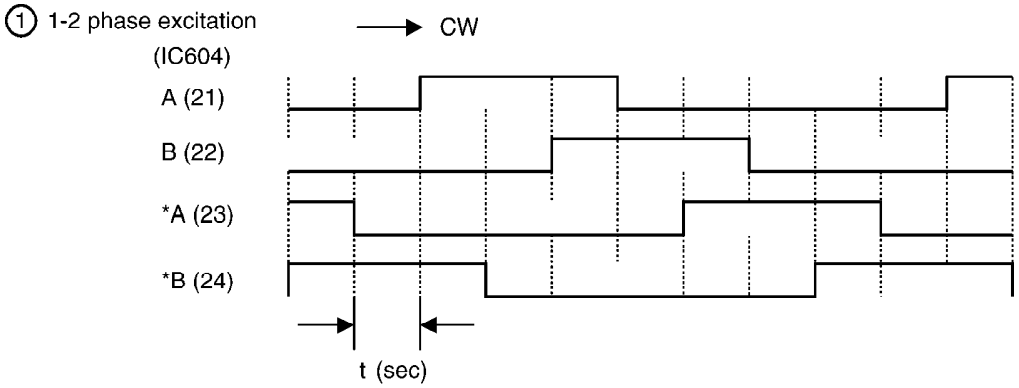
Stepping pulses are output from ASIC IC606 pins, 21, 22, 23, 24, causing driver IC610 pins,

16 ~ 13 to drive the motor coil.

The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation.

A 1-step rotation feeds 0.065mm of document paper.

7.7.2.1. TIMING CHART

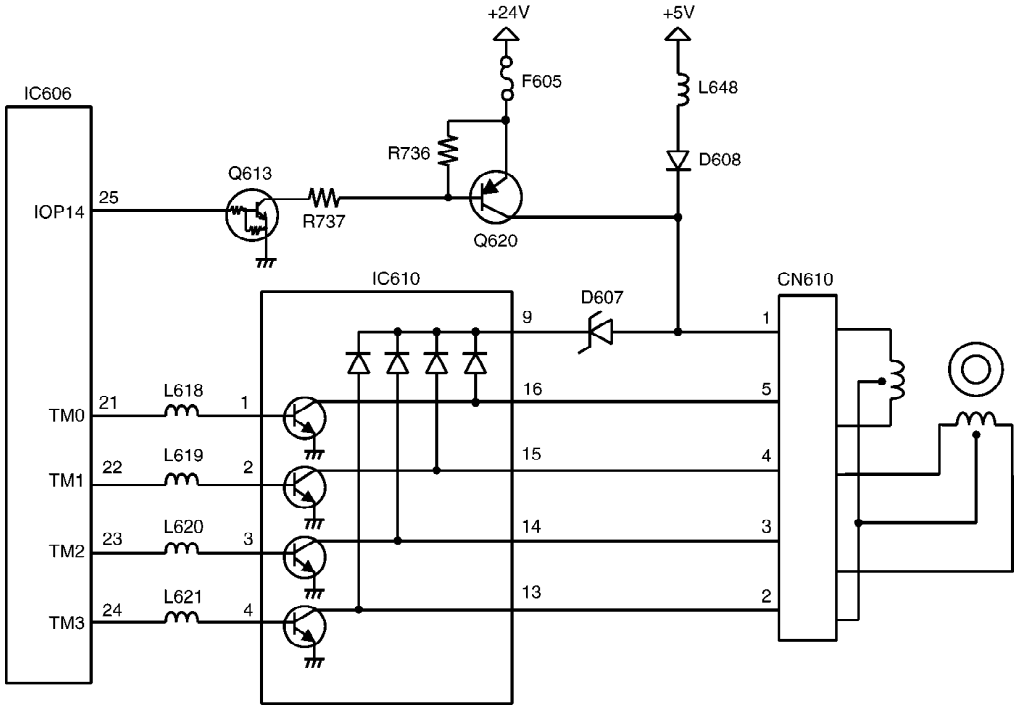


② 1-2 phase excitation output wave form (example "A Phase")



Other phase (B, *A, *B) operates as A phase does.

7.7.2.2. SCAN MOTOR (ADF MOTOR) DRIVE CIRCUIT

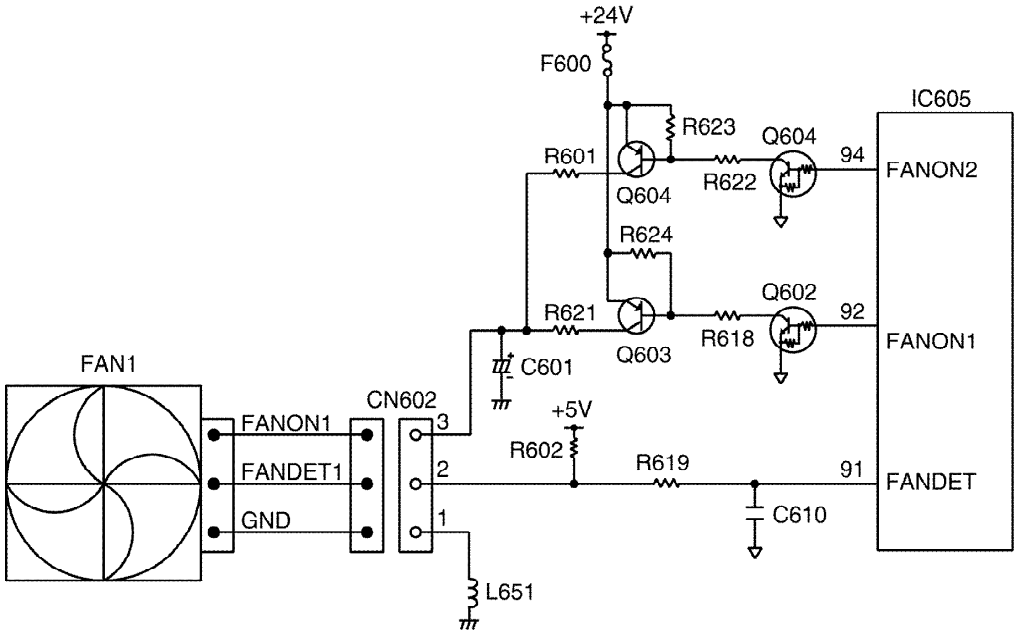


DRIVE MODE

FUNCTION		MODE	PHASE PATTERN	SPEED
SCAN	FAX	STANDARD	2 phase	579pps
SCAN	FAX/COPY	FINE/PHOTO	2 phase	579pps
SCAN	FAX/COPY	SUPER FINE	1-2 phase	579pps
SCAN	FAX/COPY	PHOTO WITH TEXT	2 phase	579pps
SCAN	DOC.PREFEED/ EJECT	-	2 phase	579pps
STAND-BY		-	ALL PHASE OFF	-

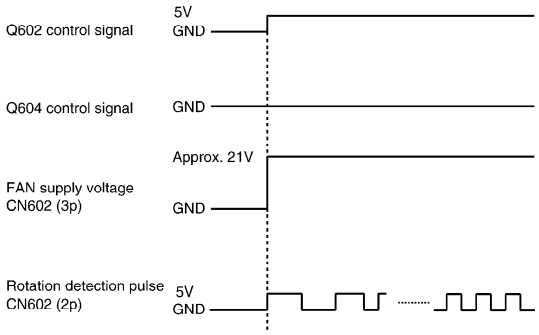
7.8. FAN MOTOR SECTION

This FAN is used to radiate heat in the unit.
The signal level at pin 92/94 of IC605 becomes high, the FAN is activated. In this case, the pulse signal as shown below input to pin 91 of IC605 and the rotation of the FAN is detected.

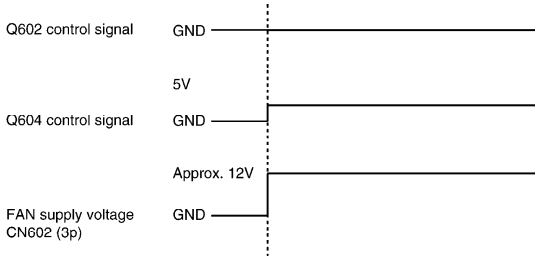


7.8.1. FAN CONTROL

This unit is equipped with fan to prevent the developing device from rising in temperature while printing.
The air is inhaled from the right side of the unit.
The fan rotates at high speed (Approx. 3000 rpm) while printing (controlling the developing device). After printing is finished, it rotates at low speed (Approx. 2200 rpm) when the temperature of the unit goes up over a fixed one or depending on the number of printed papers (frequency).
While the fan is rotating at high speed, the voltage of Approx. 21 V is supplied to the fan, however, while rotating at low speed, the supply voltage is decreased to Approx. 12V.
Each signal wave is as follows:
1. High-speed rotation (typ. 3000 rpm)

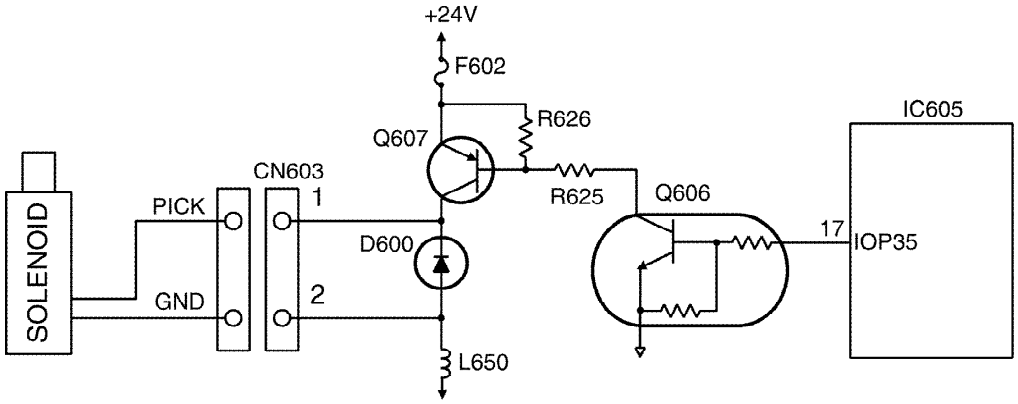


2. Low-speed rotation (typ. 2200 rpm)



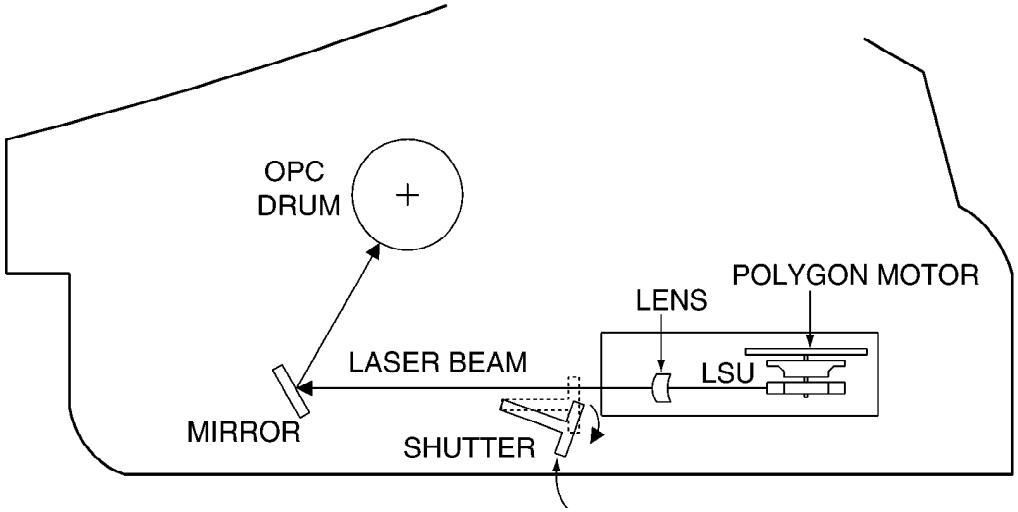
7.9. SOLENOID DRIVE SECTION

The solenoid drive circuit controls the pick-up clutch.
The solenoid is designed to be driven by +24V, driven by IC605-17 pin.
Diode D600 protects Q607 from backward voltage when the solenoid is driven.

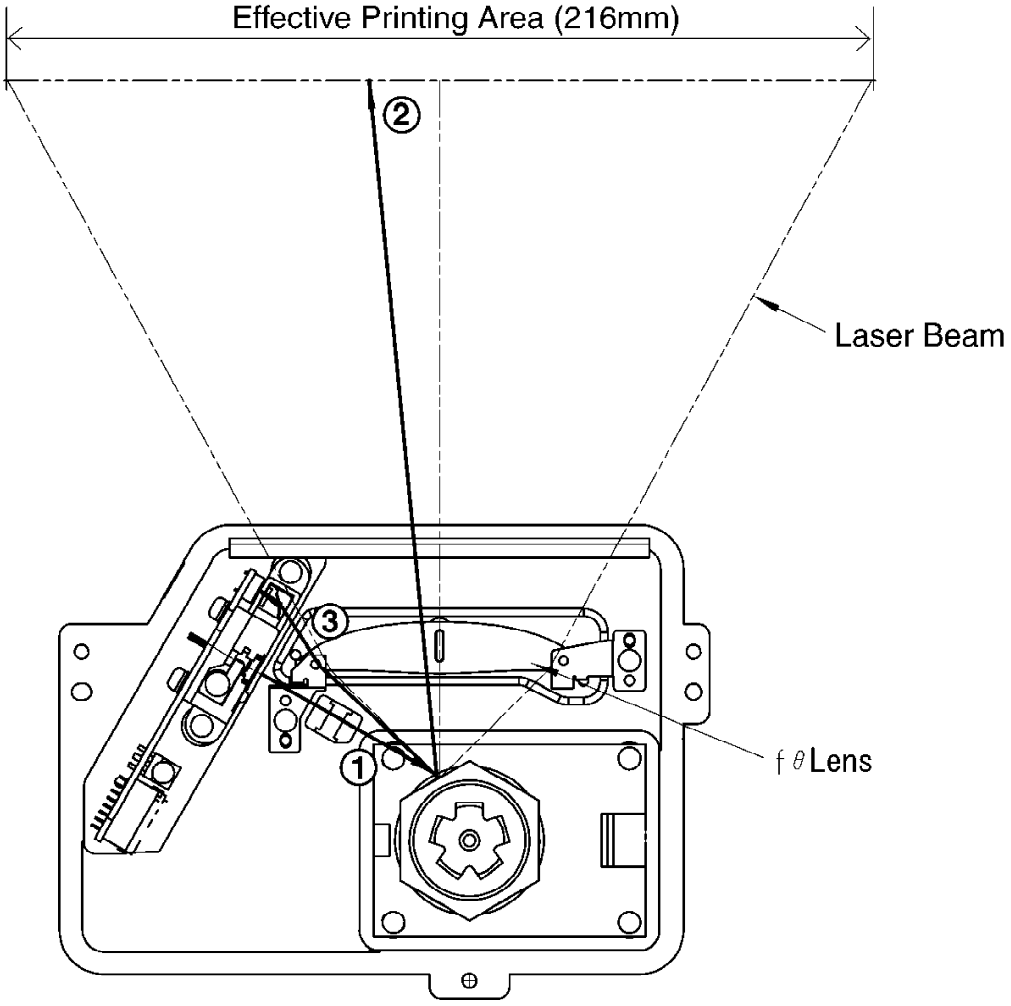


Mode	IC606-149 pin
SOLENOID ON	high level
SOLENOID OFF	low level

7.10. LSU (Laser Scanning Unit) SECTION

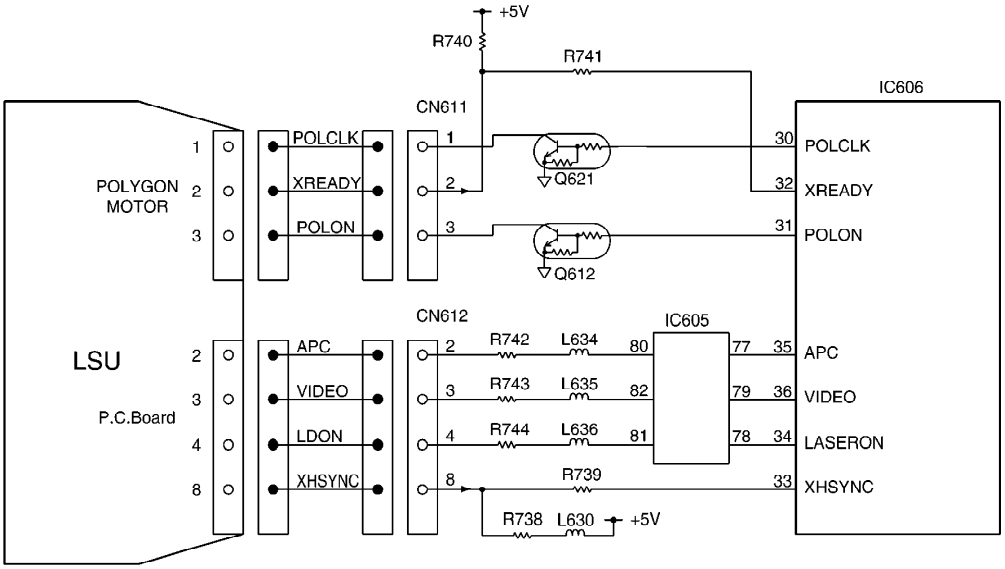


The mechanical shutter will be opened by setting DRUM UNIT properly.

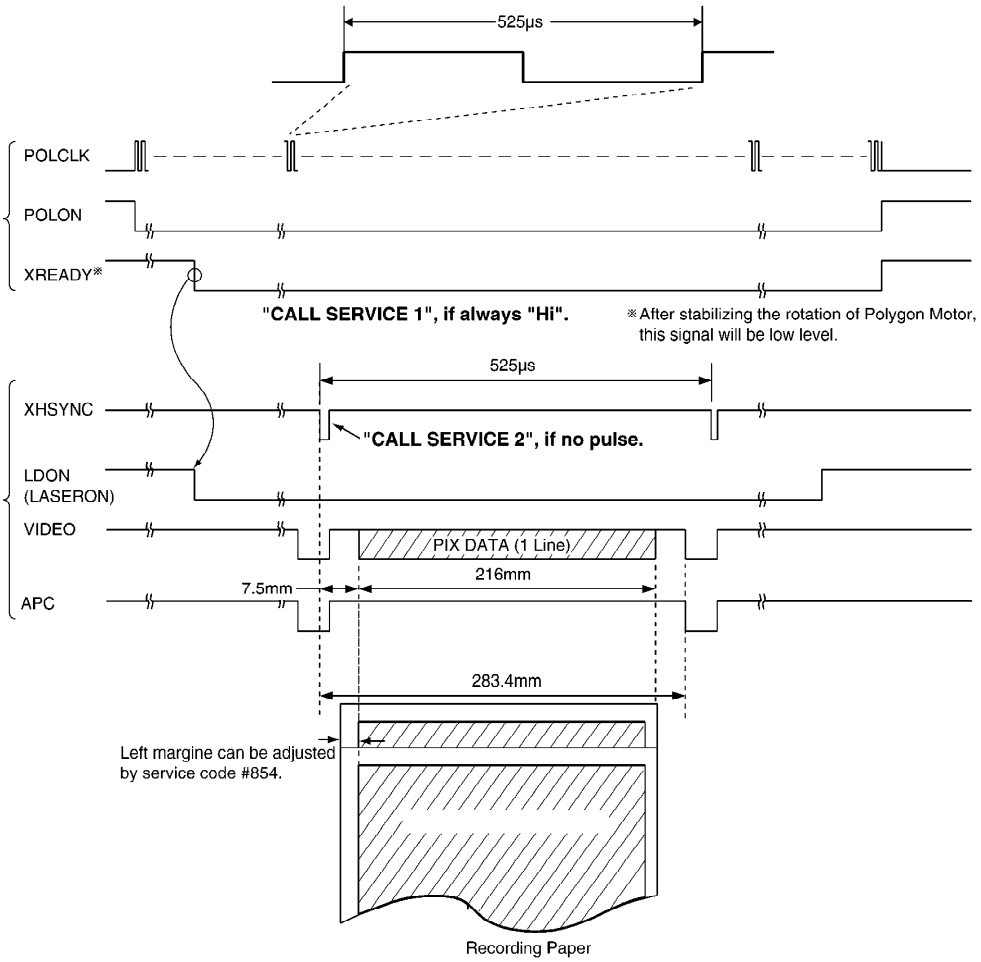


① Laser output
② Laser reflecting on the drum
③ Laser towards the effective printing outside range onto the sensor

Circuit Diagram



Timing Chart



7.11. SENSORS AND SWITCHES SECTION

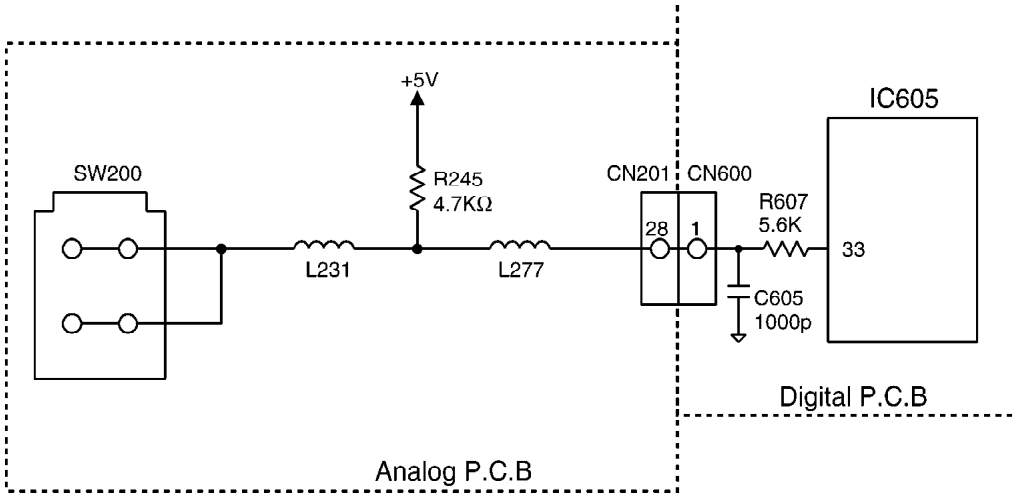
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	PS101	Document set	[CHECK DOCUMENT]
Operation Panel	SW146	Paper Feed	[REMOVE DOCUMENT]
High Voltage PCB	SW101	Printer Open	[COVER OPEN]
Toner Sensor PCB	SW60	OPC Set	[CHECK DRUM]
Digital PCB	PS601	Register	[FAILED PICKUP]
Digital PCB	PS600	Paper	[OUT OF PAPER]
Exit Sensor PCB	PS51	Exit	[PAPER JAMMED]
Toner Sensor PCB	SW60,IC60	Dev & Toner Set	[TONER EMPTY] / [TONER LOW] [CHECK DRUM]
Analog PCB	SW200	Hook	————

Note:
See TEST FUNCTIONS - SENSOR CHECK SECTION for the sensor test.
(#815 of Service Mode test. Refer to TEST FUNCTIONS ().

7.11.1. HOOK SWITCH

When the handset is raised, the switch is turned OFF, and the signal at pin 33 of IC605 is high. / When the handset is returned, the switch is turned ON, and the signal at pin 53 of IC605 is low.



7.11.2. DOCUMENT SENSOR

The Sensor detects whether or not a document is in place. / When a document is detected, the shelter plate shuts off the sensor light, the photo-transistor turns OFF, and the input signal of IC101-19pin becomes a high level. When there is no document, the shelter plate let the sensor

light pass through, the photo-transistor turns ON, and the input signal of IC101-19pin becomes a low level.

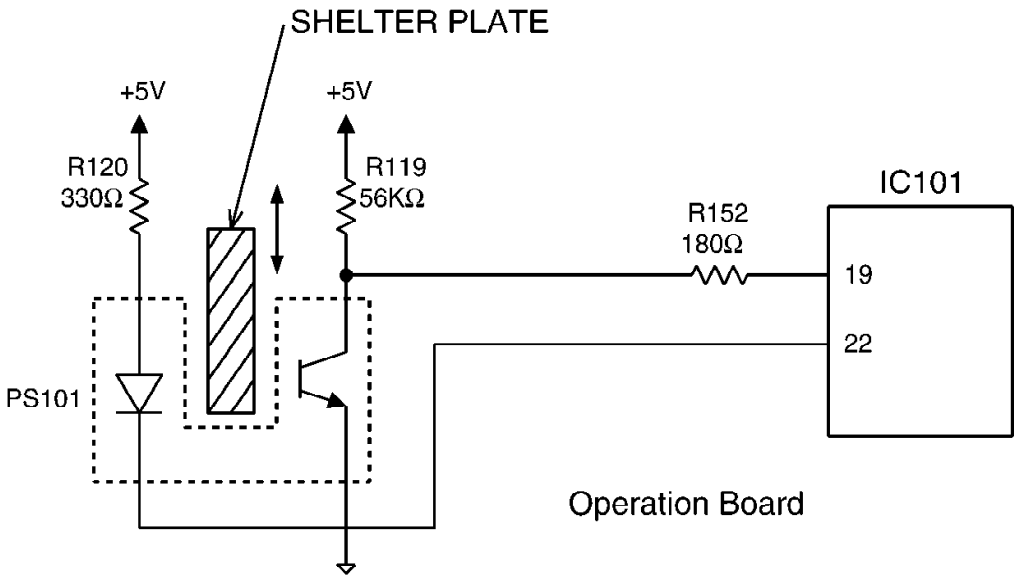
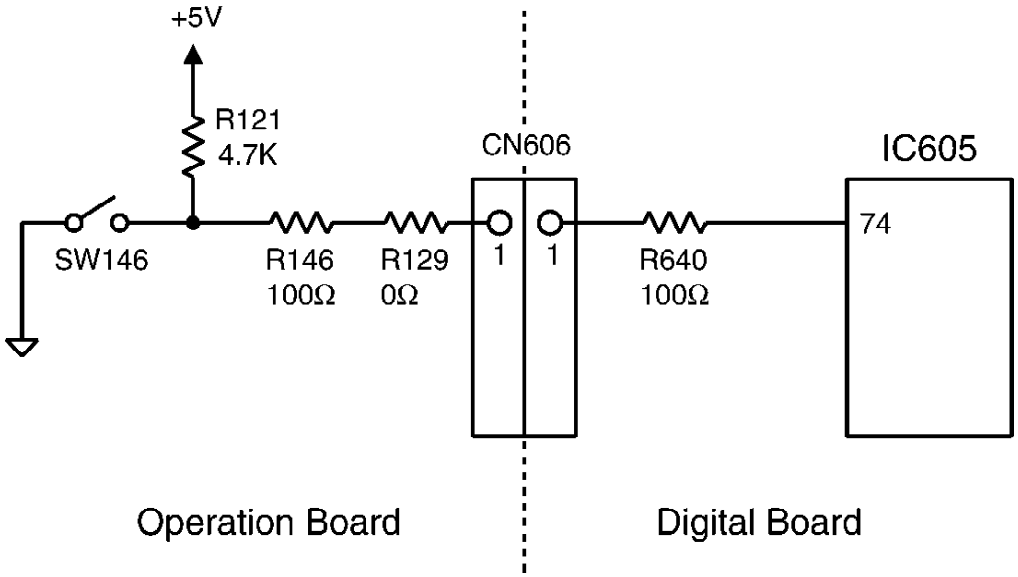


	Photo-transistor	Signal (IC101-19pin)
Document Set	**OFF**	**High level**
No Document	**ON**	**Low level**

7.11.3. PAPER FEED SENSOR

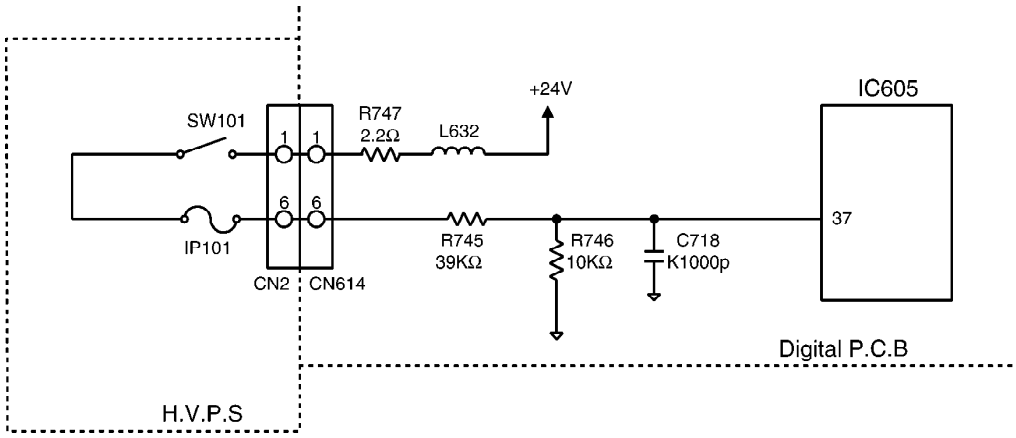
The Sensor detects the front edge of the document. / When a document is detected, the switch turns ON, and the input signal of IC605-74pin becomes a low level. When there is no document, the switch turns OFF, and the input signal of IC605-74pin becomes a high level.



	Switch	Signal (IC605-74pin)
Read Position	ON	Low level
Non Read Position	OFF	High level

7.11.4. TOP COVER OPEN SWITCH

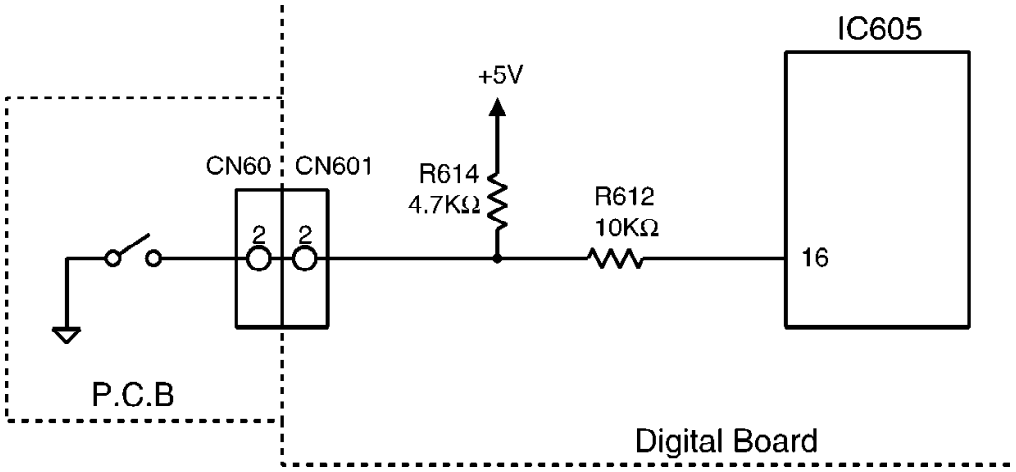
The Switches detect whether the printer cover is open or closed. / When the printer cover is closed, the switches turn ON, and the input signal of IC605-37pin becomes a high level. / When the printer cover is open, the switches turns OFF, and the input signal of IC605-37pin becomes a low level.



	Switch	Signal (IC605-37 pin)
Open	OFF	Low level
Close	ON	High level

7.11.5. DRUM SENSOR

The Switch detects whether the OPC unit is set or not. / When there is the DRUM unit, the input signal of IC605-16pin becomes a high level. / When there is no DRUM unit, the input signal of IC605-16pin becomes a low level.



	Signal (IC605-16 pin)
DRUM Set	High level
No DRUM	Low level

7.11.6. REGIST SENSOR

The Sensor detects whether or not the recording paper is present so that printing can start. / When the recording paper is detected, the shelter plate let the sensor light passing through, the photo-transistor turns ON, and the input signal of IC605-5pin becomes a low level. / When there is no recording paper, the shelter plate closes the sensor light, the photo-transistor turns OFF, and the input signal of IC605-5pin becomes a high level.

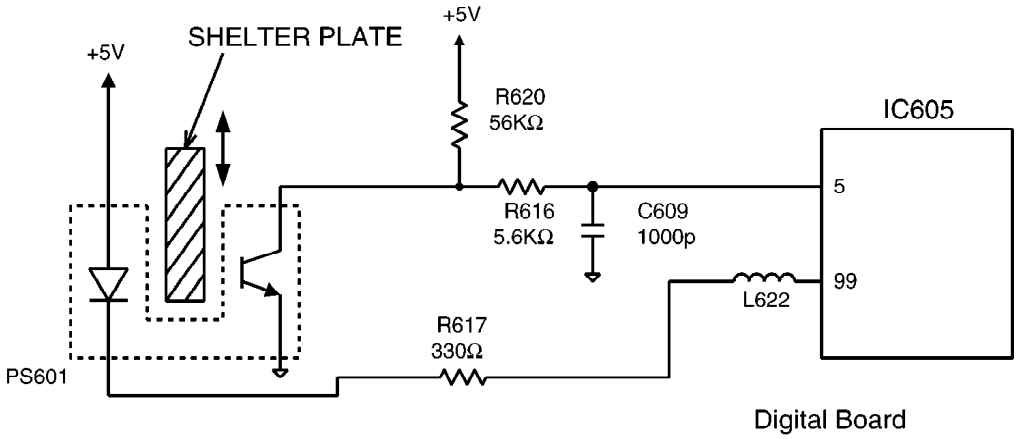
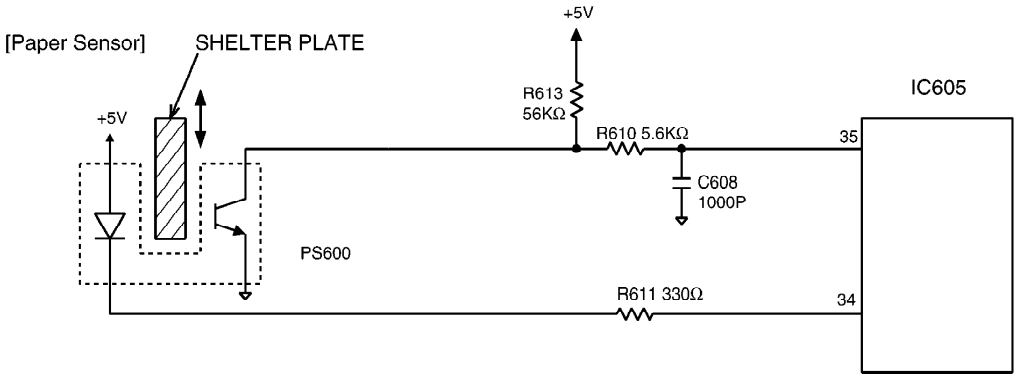


	Photo-transistor	Signal (IC605-5 pin)
No Recording Paper	OFF	High level
Recording Paper Regist	ON	Low level

7.11.7. PAPER SENSOR..... “OUT OF PAPER”

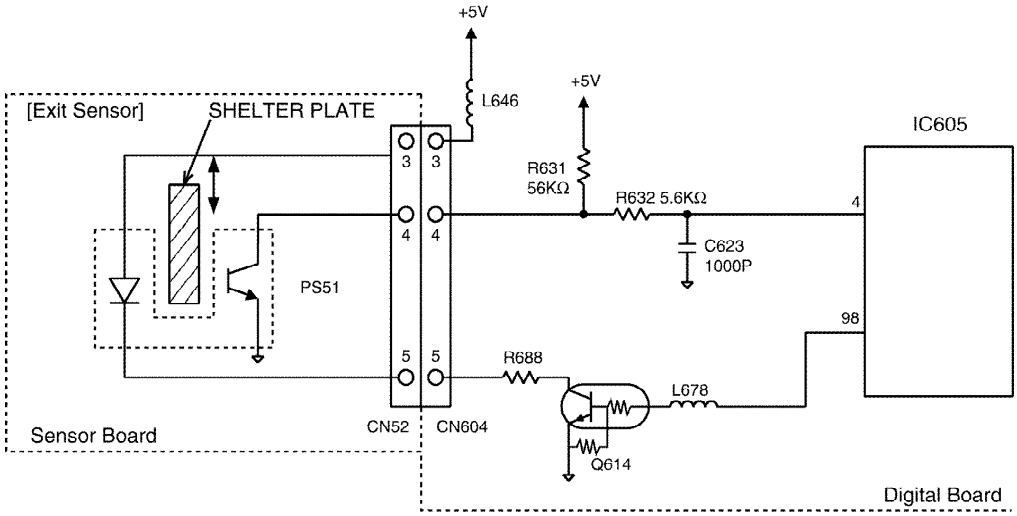
The Sensor detects the recording paper are in place.
When the recording paper is detected, the shelter plate let the sensor light passing through, the photo-transistor turns ON, and the input signal of IC605-35 pin becomes a low level.
When there is no recording paper, the shelter plate closes the sensor light, the photo-transistor turns OFF, and the input signal of IC605-35 pin becomes a high level.



[Paper Sensor]

	Photo-transistor	Signal (IC605-35 pin)
Recording Paper Set	OFF	Low level
No Recording Paper	ON	High level

7.11.8. PAPER EXIT SENSOR..... “PAPER JAMMED”



The sensor detects whether the recording paper exit out or noy.
When there is no recording paper at the position of the sensor, the shelter plate closes the sensor light, the photo-transistor fot tarus OFF, and the input signal of IC605-4pin becomes high level.
When the recording paper reach the exit sensor, the shelter plate let the sensor light passing through, the photo-transistor ON, and the input signal of IC605-4pin becomes a low level.

[Exit Sensor]

	Photo-transistor	Signal (IC605-4 pin)
No Paper	OFF	High level
Paper Exist	ON	Low level

7.11.9. Detecting New Drum Units

Purpose
To investigate the actual number of printed papers with the drum units
(Investigating how the returned sets' drum units were used)
Method
Whether the drum unit is new or old should be judged by detecting the turn delay of Mixing

Paddle (Toner detection sensor).

- When shipping the drum unit, the mixing paddle gear is set to the position that has the space of more than one turn (max. 600).

- After the main motor starts, when the toner detection signal is not varied within the fixed time (max. 4.5 sec), the drum unit is found new.

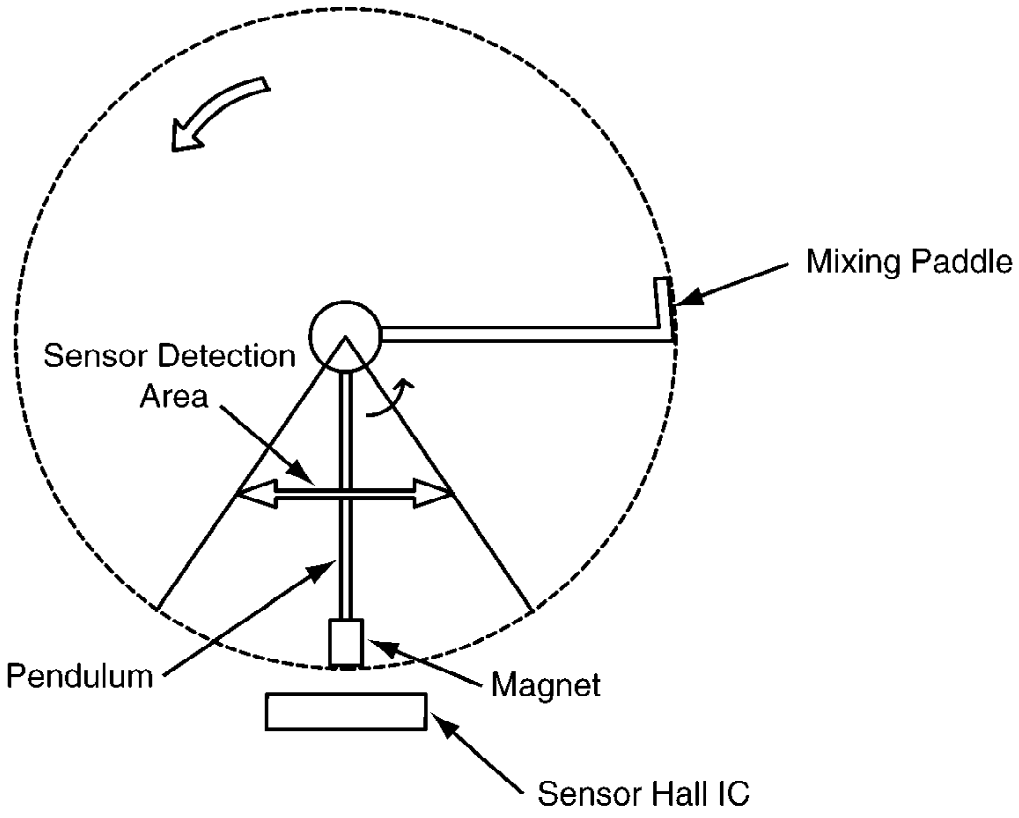
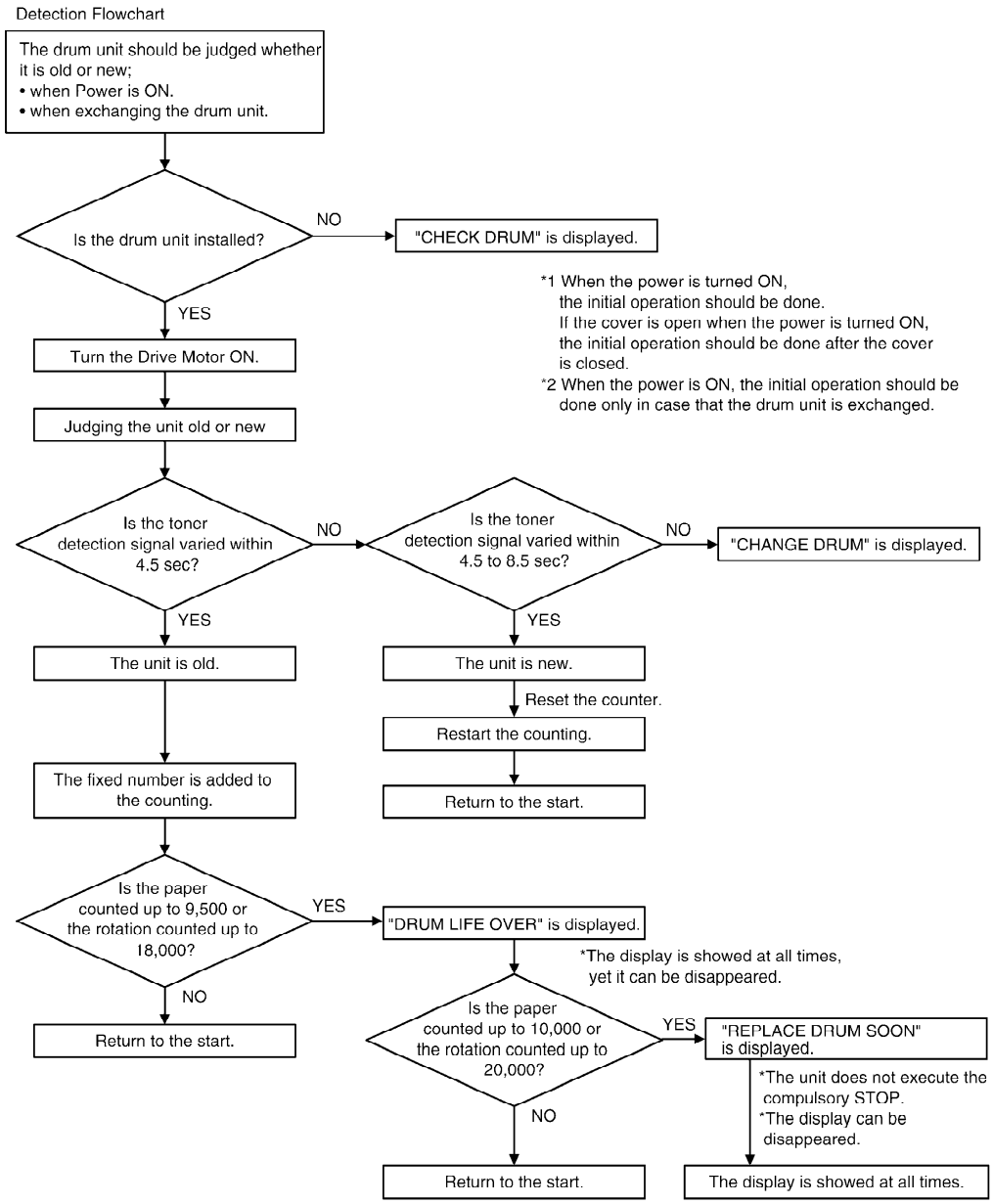
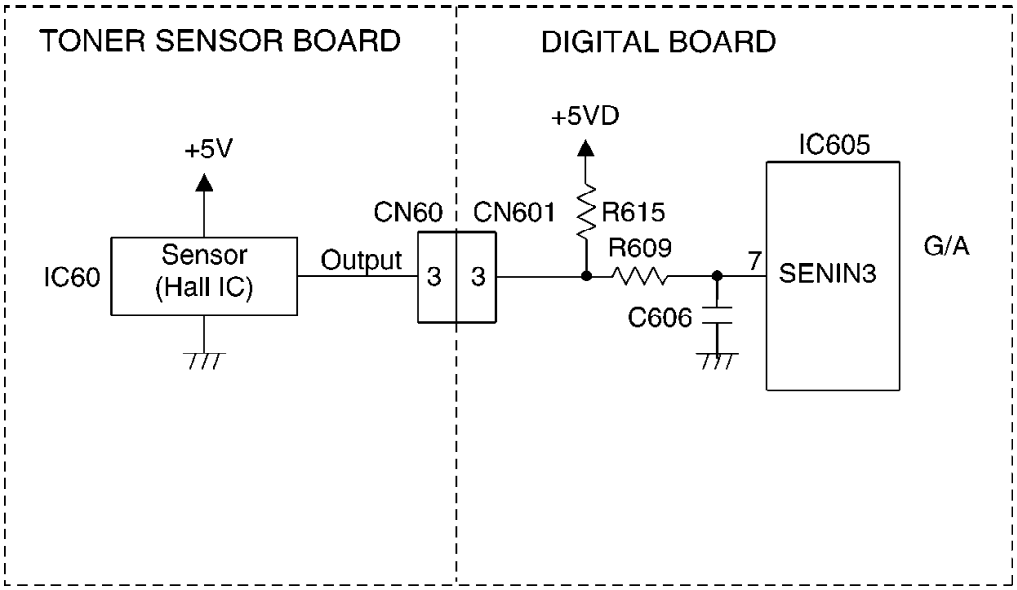


Fig. a

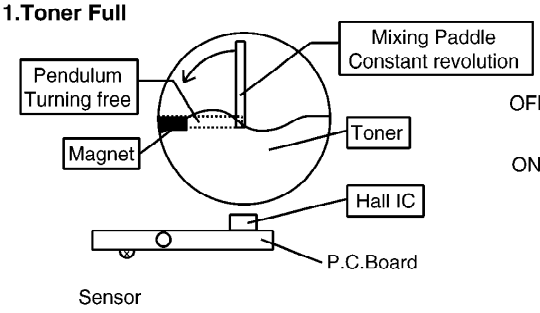


7.11.10. TONER SENSOR.... “TONER EMPTY”, “TONER LOW”, “CHANGE DRUM”

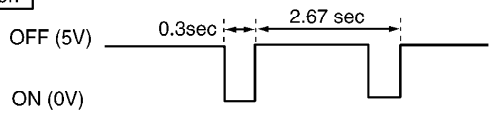
The Sensor detects whether or not the Drum unit and the toner are present.
When there is not Drum unit, Hall IC (IC60) turns off, and the input signal of IC605-7 pin (Digital P.C.B) becomes a High level over 9s. When the Developer unit is set, Hall IC (IC60) turns ON/ OFF. If the time of IC605-7 pin's Low level is under 600ms, there is enough toner in Developer unit, if not, toner is near empty.



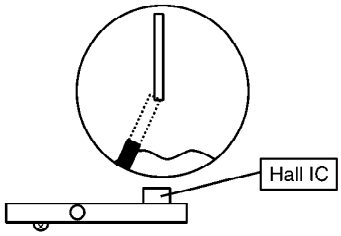
1.Toner Full

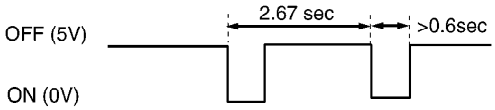


Sensor Signal

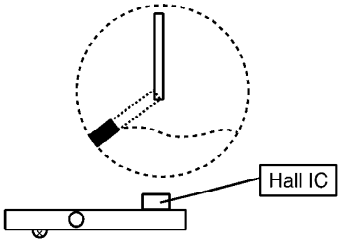


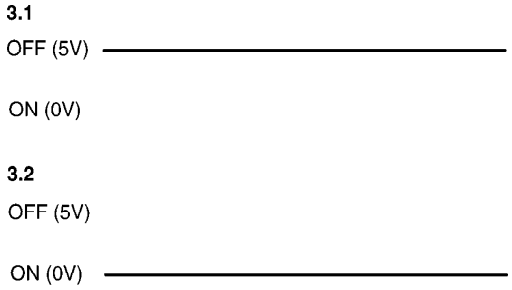
2. Toner Low





3. In case the Mixing Paddle does not rotate





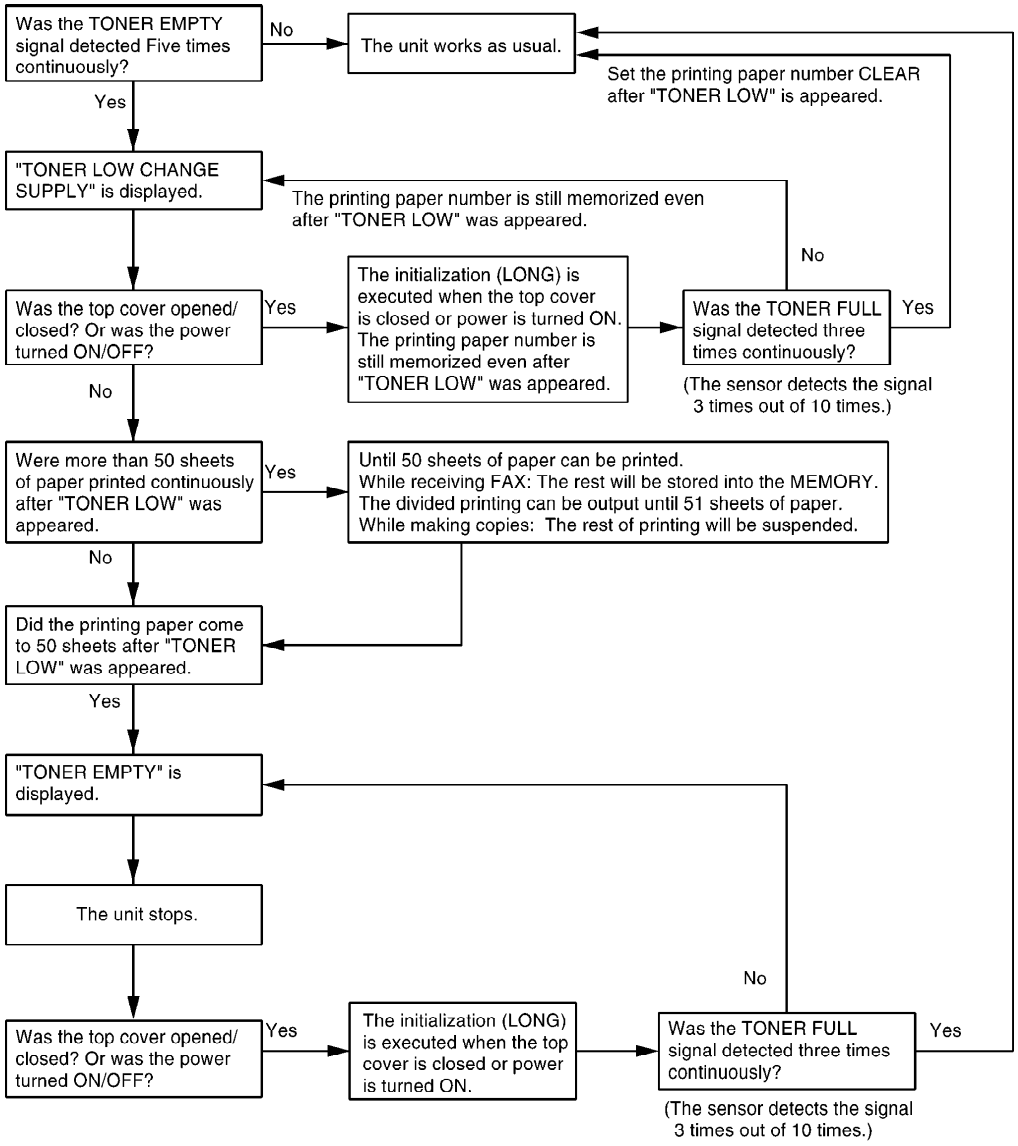
Toner Sensor

The rest of toner is detected by the move speed of the magnet put on the pendulum of Mixing Paddle. The pendulum is pushed up by the Mixing Paddle, then it falls down by its own weight. The rotation speed of paddle is set slower than the one of pendulum which falls down by its

own weight. When the toner is still left, the pendulum falls and stops on the toner, then pushed by the paddle, it starts to rotate. When no toner is left, the pendulum falls to the bottom. Consequently the contact time between the magnet and steel becomes short when toner is left and long with no toner.

State	Display	Signal (IC605-7pin)
Toner Set (full)	-	Low level = about 0.3s
Near Empty Toner	TONER LOW	Low level>0.6s
Mixing Paddle does not rotate (“CHANGE DRUM”)	CHANGE DRUM	High level fix or Low level fix

7.11.10.1. TONER DETECTION FLOW



CAUTION:

1. Toner low can be judged by continuous 5-times TONER LOW

signal at only printing.
(It is not executed at.)

2. Toner full can be judged by continuous 3-times TONER FULL signal at initialization.
(It is not executed at printing.)

3. In the ordinal operation, “CHECK DRUM” is displayed when TONER EMPTY sensor does not generate a signal for 2.7 seconds.

7.12. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC101) and ASIC (IC610: on the DIGITAL BOARD).
The key matrix table is shown below.

1. Key Matrix

A. Hard Scan

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	K
KSL0	AUTO ANSWER	CALLER IQ	NEXT	STOP	MENU	FLASH	H/S MUTE	RE PA
KSL1	QUICK SCAN	S6	VOL-	CID-SEARCH	DIRECTORY/ PROGRAM	#	0	
KSL2	COPY	----------	PREV	CID-PRINT	----------	9	8	
KSL3	RESOLUTION	COLLATE	----------	S12	MONITOR	3	2	
KSL4	FAX START	----------	VOL+	S11	HELP	6	5	

*LED7 should be set to KSL4. "8 x 5" key matrix is executed by hardware scanning.

B. Soft Scan

	SKIN0 (XLED8)	KIN1 (XLED12)	KIN2 (XLED11)
SKS0 (LED6)	S10	S7	S9
SKS1 (XLED9)	S4	S2	S3
SKS2 (XLED10)	S5	S1	S8

2. LED

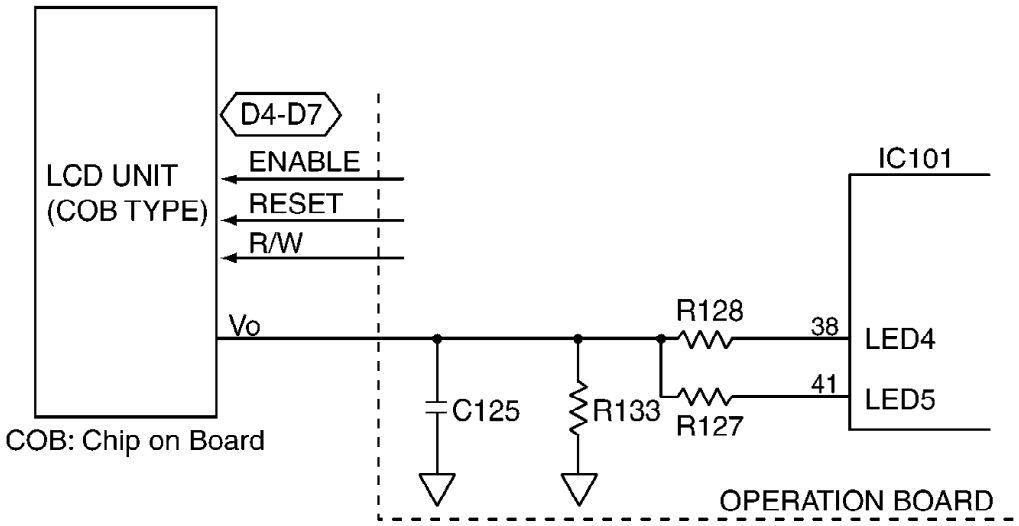
- AUTO ANSWER LED ON/OFF port---LED2

- CALLER IQ LED ON/OFF port---LED3

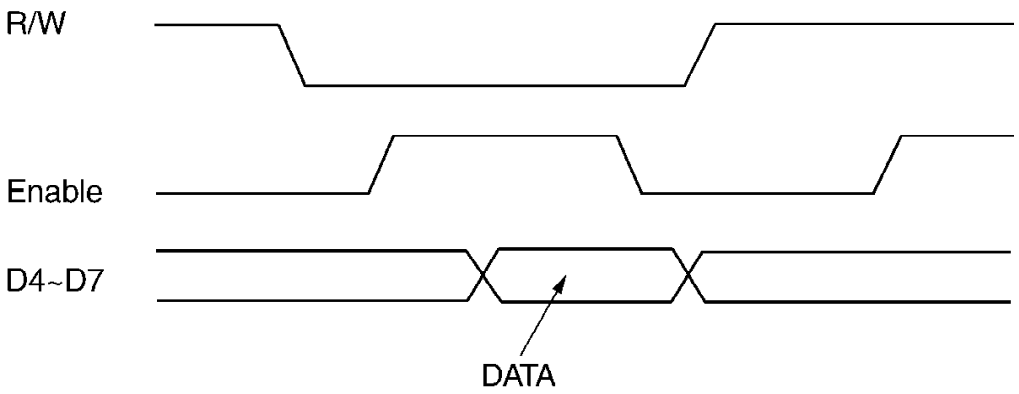
7.13. LCD SECTION

The Gate Array (IC101) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.
R130 and R134 are density control resistors.
Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC101).

Circuit Diagram



Timing Chart



<Density>

Display mode	User setting	LED4	LED5
2 LINE	NORMAL	H	L
	DARKER	L	L
Large	NORMAL	H	H
	DARKER	H	L

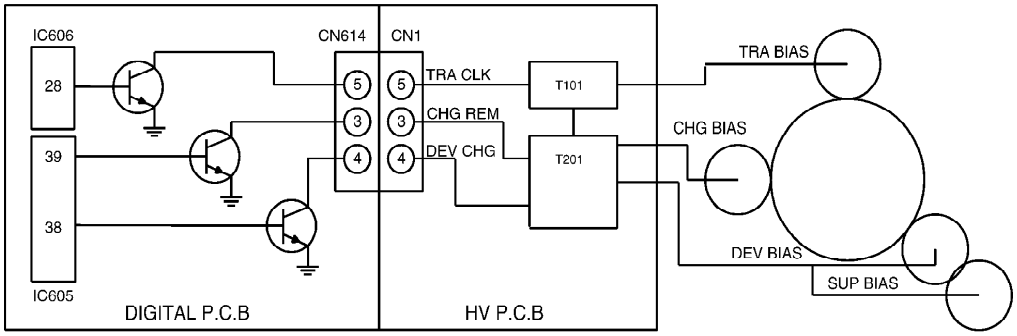
7.14. HVPS (High Voltage Power Supply) SECTION

7.14.1. HVPS SPECIFICATION

No	Output voltage	Item	Specification	Notes
1	Electrostatic Charge CHG BIAS	Rate output voltage	-1000±30V	
		Impedance range	50M~1000MΩ	
		Output format	Constant voltage	
2	Developing DEV(-) BIAS	Rate output voltage	-200±15V	
		Impedance range	10M~2000MΩ	
		Output format	Constant voltage	
	Developing DEV(+) BIAS	Rate output voltage	+150+20V	
		Output format	Constant voltage	
3	Transfer TRA(+) BIAS	Variable output current	+4~25μA	Output current varies with the rate.
		Output voltage	+3500V Max.	
		Output format	Variable Constant current	
	Transfer TRA(-) BIAS	Rate output voltage	-1000±100V	
		Output format	Constant voltage	

DEV BIAS is output from one of the output terminals after the DEV CHG signal selects DEV(+) BIAS and DEV(-) BIAS.
TRA BIAS is output from one of the output terminals after the TRA CLK signal selects TRA(+) BIAS and TRA(-) BIAS.

H.V.P.S.(High Voltage Power Supply) Circuit Diagram



7.14.2. CHG-BIAS (Charge BIAS)/DEV(-) BIAS (Developing(-) BIAS)/DEV(+) BIAS (Developing(+) BIAS) UNIT

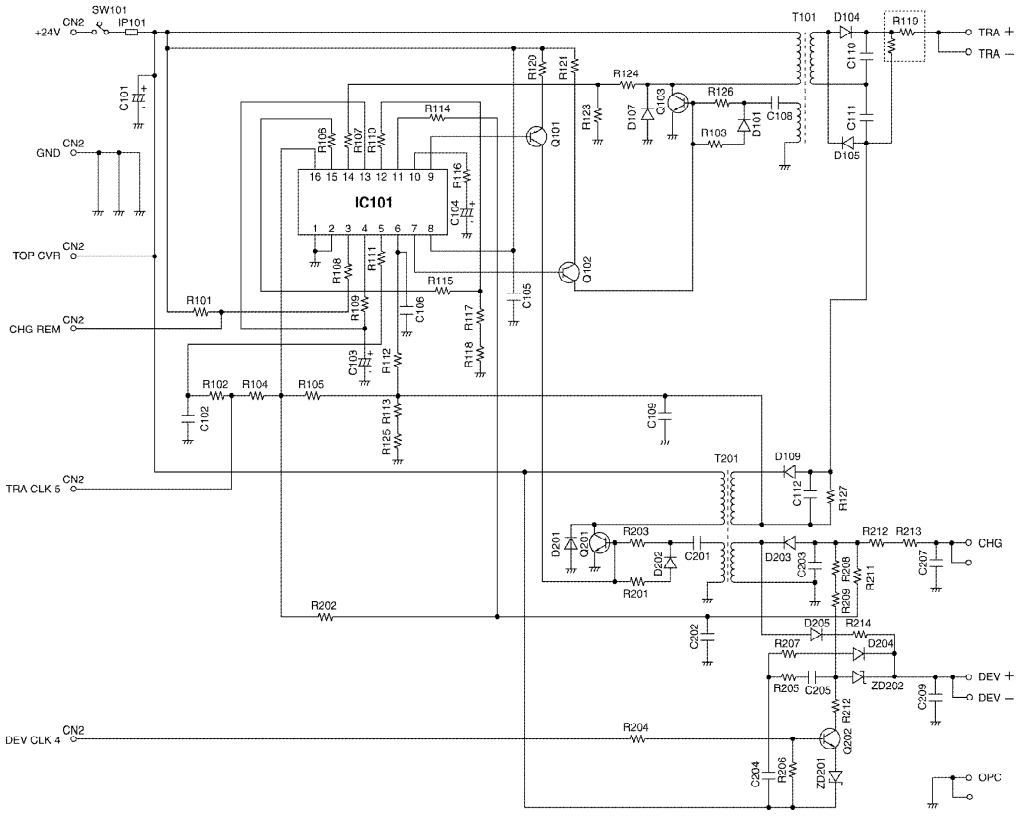
When the CHG REM terminal becomes “L”, the transistor Q201 turns ON by IC101, Charge BIAS(-1000V) is output from CHG OUTPUT, Developing(-) BIAS(-200V) is output from DEV(-) BIAS. After that, when DEV CHG terminal becomes “L”, Q202 turns ON, and Developing(+) BIAS(+150V) is output from DEV(+) BIAS.

7.14.3. TRA(+) BIAS (Transfer(+) BIAS)/TRA(-) BIAS (Transfer(-) BIAS) UNIT

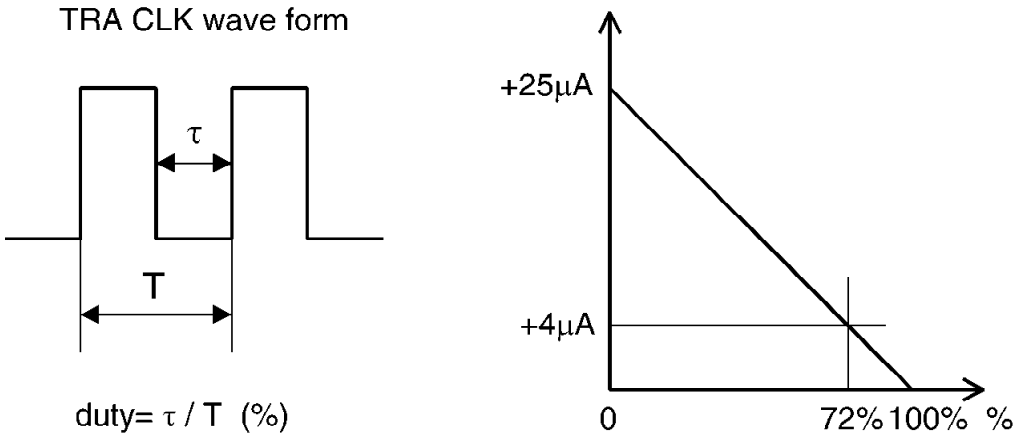
When the CHG REM terminal is “L” and the TRA CLK terminal is “Open”, Transfer(-) BIAS(-1000V) is output from TRA OUTPUT the moment Charge BIAS(-1000V) is output from CHG OUTPUT. When 7.8KHz PWM (pulse-width modulation) signal is input to the TRA CLK terminal, Q103 turns ON by IC101, and TRA(+) CURRENT BIAS according to the PWM signal is output

from TRA OUTPUT. The PWM signal will be turned to a constant voltage by the resistor and the condenser, and input to the IC101. The IC101 compares this voltage with the feedback voltage from T101 and controls the Q103. As for the transfer current, +25 μ A is output when DUTY of the TRA CLK input signal is 0%, or +4 μ A is output when that is 72%.

Circuit Diagram



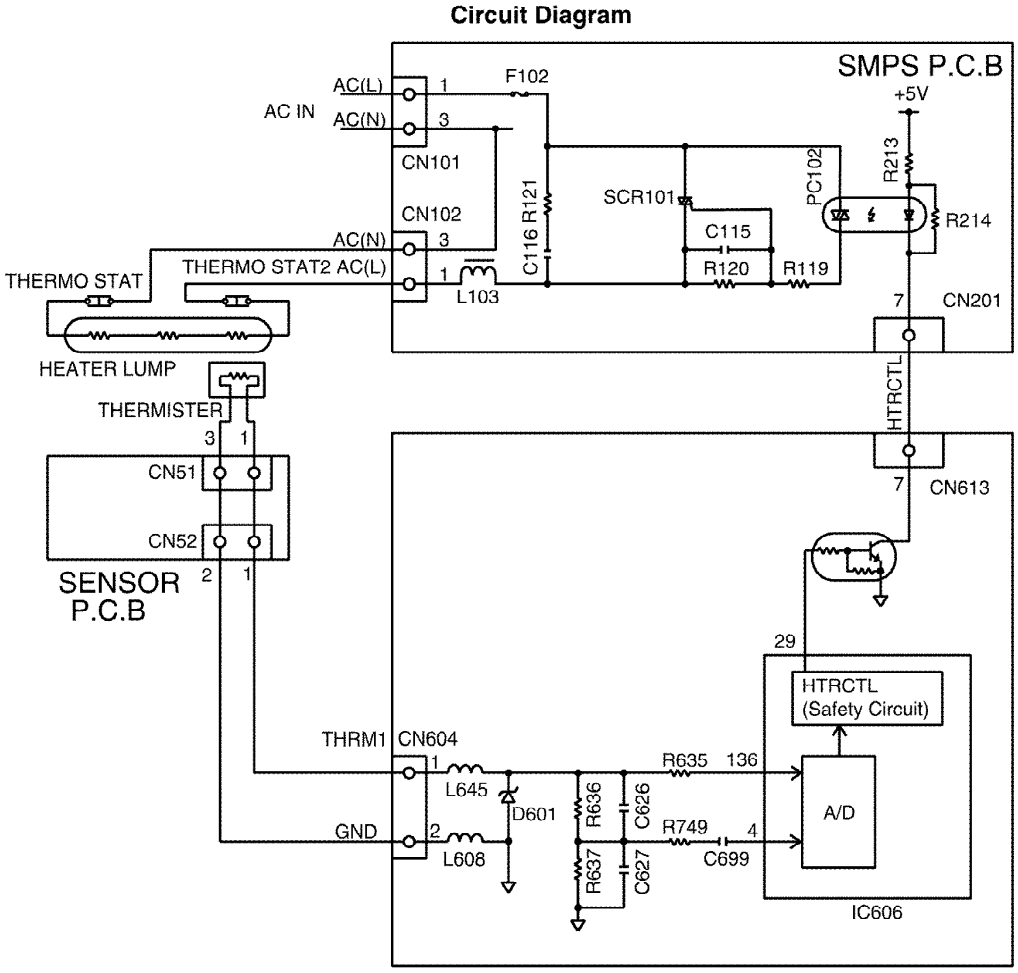
Transfer Current Variation by PWM Input



7.15. HEAT LAMP CONTROL CIRCUIT

The temperature of the fixing part of the Fixing Unit is converted to a voltage by THERMISTOR and input to IC606-4pin. The heater turns ON/OFF the photo-coupler PC102 at the heater control port (IC606-29pin), and is turned ON/OFF at the triac SCR101. And two thermostats are set on

the AC line as the safety devices.

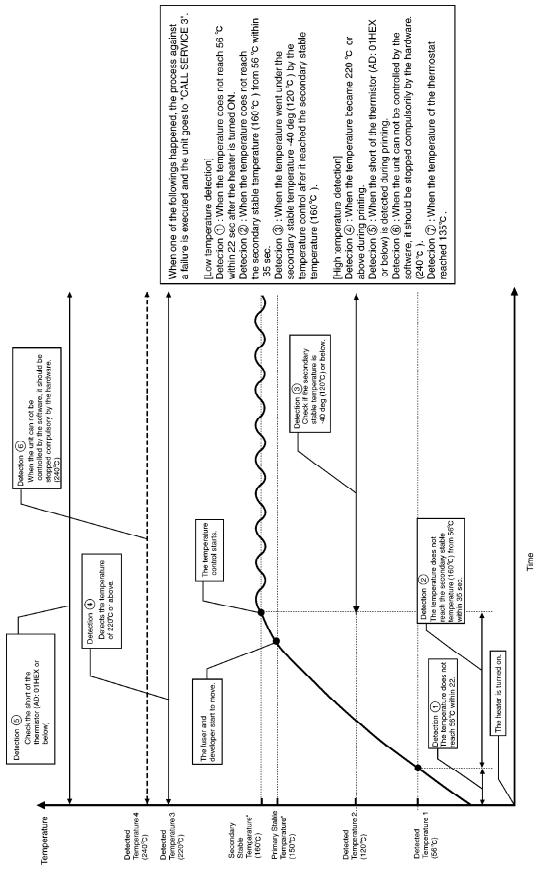


1. Control at Printing

A. After the printing signal is received, turn ON the heater.

B. After that, turn ON the motor at the Primary Stable Temperature (150°C).

C. After that, control at the Secondary Stable temperature (160°C), and feed papers.

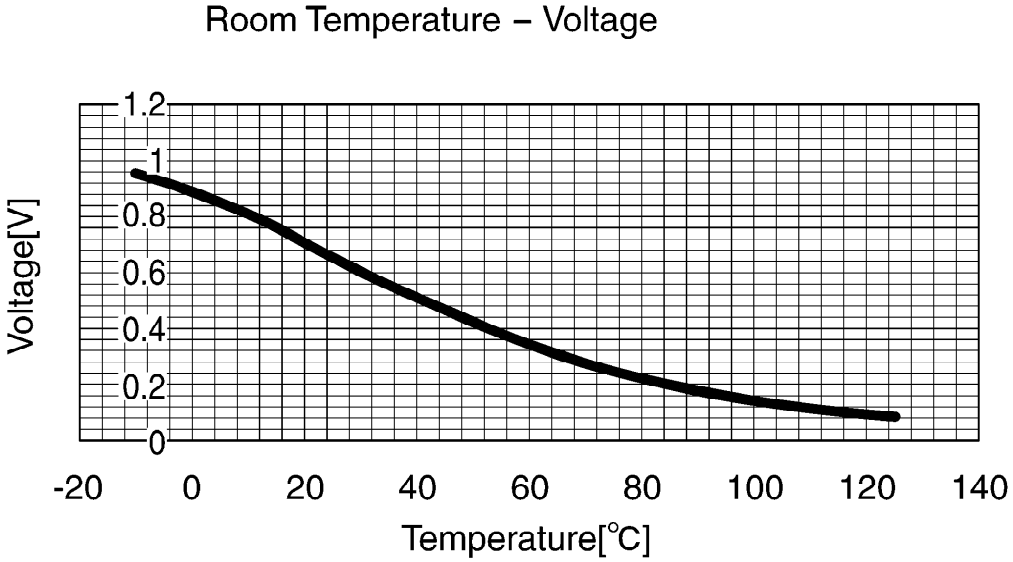


2. Safety Protection

A. 2 thermostats are provided with the unit, and the heater circuit is shut down when their surface temperatures became over 135°C.

B. The heater control circuit of IC606 has the built-in function that the software turns off the heater control automatically if the heater is not turned ON every a fixed time.

C. When the temperature became over 240°C, the heater control circuit of IC606 is turned off forcedly and system reset (IC606 pin 20 becomes Low) will be executed.

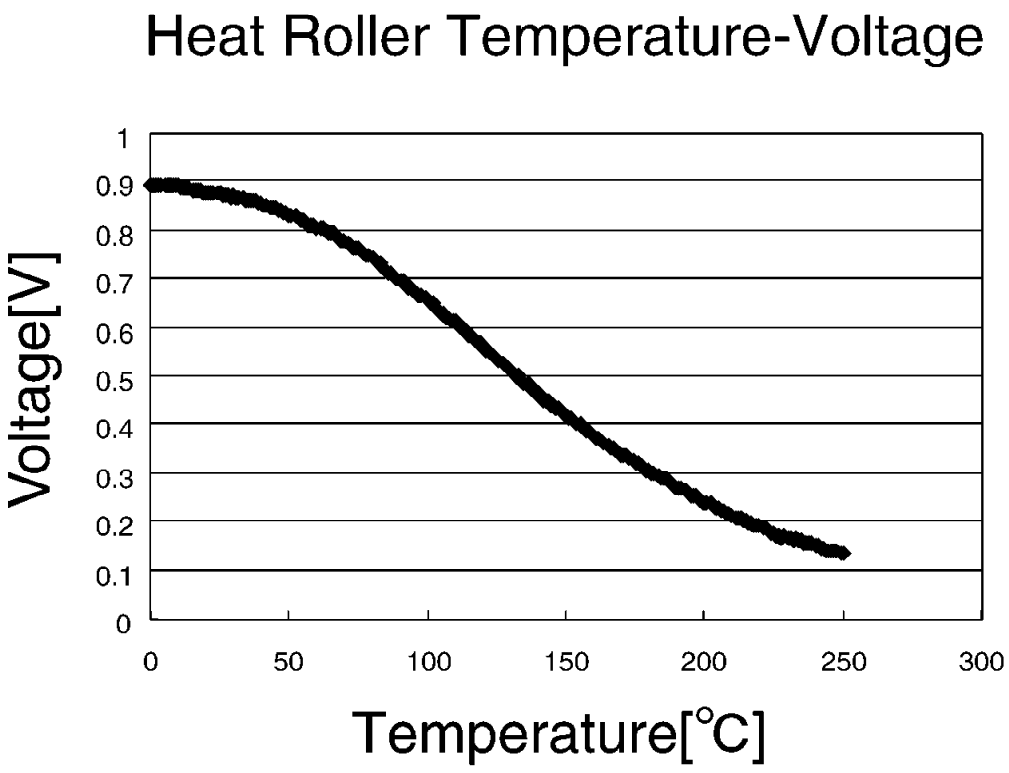


The correspondence readings between temperature measured by thermistor and HEX readings

Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
-10	C2	36	41	82	12
-9	BF	37	40	83	12
-8	BC	38	3E	84	11
-7	B9	39	3C	85	11
-6	B5	40	3A	86	10
-5	B2	41	39	87	10
-4	AF	42	37	88	10
-3	AB	43	36	89	0F
-2	A8	44	34	90	0F
-1	A5	45	33	91	0E
0	A2	46	31	92	0E
1	9E	47	30	93	0E
2	9B	48	2F	94	0D
3	98	49	2D	95	0D
4	95	50	2C	96	0D
5	91	51	2B	97	0C
6	8E	52	2A	98	0C
7	8B	53	29	99	0C
8	88	54	27	100	0C
9	85	55	26	101	0B
10	82	56	25	102	0B
11	7F	57	24	103	0B
12	7C	58	23	104	0A
13	79	59	22	105	0A
14	76	60	21	106	0A
15	73	61	20	107	0A
16	70	62	20	108	09
17	6D	63	1F	109	09

Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
18	6A	64	1E	110	09
19	68	65	1D	111	09
20	65	66	1C	112	09
21	63	67	1B	113	08
22	60	68	1B	114	08
23	5D	69	1A	115	08
24	5B	70	19	116	08
25	59	71	19	117	08
26	56	72	18	118	07
27	54	73	17	119	07
28	52	74	17	120	07
29	4F	75	16	121	07
30	4D	76	15	122	07
31	4B	77	15	123	07
32	49	78	14	124	06
33	47	79	14	125	06
34	45	80	13		
35	43	81	13		

Note:
The value is displayed on LCD at TEST FUNCTIONS () [#815].



The correspondence readings between temperature measured by fixing thermistor and HEX readings

Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
0	E4	84	B8	168	58
1	E4	85	B7	169	57
2	E4	86	B6	170	56
3	E4	87	B5	171	56
4	E4	88	B4	172	55
5	E4	89	B3	173	54
6	E3	90	B2	174	53
7	E3	91	B1	175	52
8	E3	92	B0	176	51
9	E3	93	AE	177	50
10	E3	94	AD	178	4F
11	E2	95	AC	179	4E
12	E2	96	AB	180	4D
13	E2	97	AA	181	4C
14	E2	98	A9	182	4C
15	E1	99	A8	183	4B
16	E1	100	A7	184	4A
17	E1	101	A6	185	4A
18	E1	102	A5	186	49
19	E0	103	A3	187	48
20	E0	104	A2	188	47
21	E0	105	A1	189	46
22	E0	106	A0	190	45
23	DF	107	9E	191	44
24	DF	108	9D	192	44
25	DF	109	9C	193	43
26	DE	110	9C	194	42
27	DE	111	9A	195	41
28	DE	112	99	196	40
29	DD	113	98	197	40
30	DE	114	96	198	3F
31	DD	115	95	199	3E
32	DD	116	94	200	3D
33	DD	117	93	201	3C
34	DC	118	91	202	3C
35	DC	119	90	203	3B
36	DB	120	8F	204	3A
37	DB	121	8D	205	3A
38	DB	122	8D	206	39
39	DA	123	8B	207	38

Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
40	DA	124	8A	208	37
41	D9	125	89	209	37
42	D9	126	88	210	36
43	D8	127	86	211	35
44	D7	128	85	212	35
45	D7	129	84	213	34
46	D6	130	82	214	33
47	D6	131	81	215	33
48	D5	132	80	216	32
49	D5	133	7F	217	32
50	D4	134	7D	218	31
51	D3	135	7C	219	30
52	D3	136	7B	220	30
53	D2	137	79	221	2F
54	D1	138	78	222	2F
55	D1	139	77	223	2E
56	D0	140	76	224	2D
57	CF	141	74	225	2D
58	CF	142	73	226	2C
59	CE	143	72	227	2C
60	CD	144	72	228	2A
61	CD	145	70	229	2B
62	CD	146	6F	230	2A
63	CC	147	6E	231	2A
64	CB	148	6D	232	29
65	CA	149	6C	233	2A
66	CA	150	6A	234	29
67	C9	151	69	235	29
68	C8	152	69	236	28
69	C7	153	68	237	28
70	C6	154	67	238	27
71	C5	155	66	239	27
72	C4	156	64	240	26
73	C3	157	63	241	26
74	C2	158	62	242	25
75	C2	159	61	243	25
76	C1	160	60	244	24
77	C0	161	5F	245	24
78	BF	162	5E	246	24
79	BE	163	5D	247	23
80	BD	164	5C	248	23
81	BC	165	5B	249	22
82	BB	166	5A	250	22
83	BA	167	59		

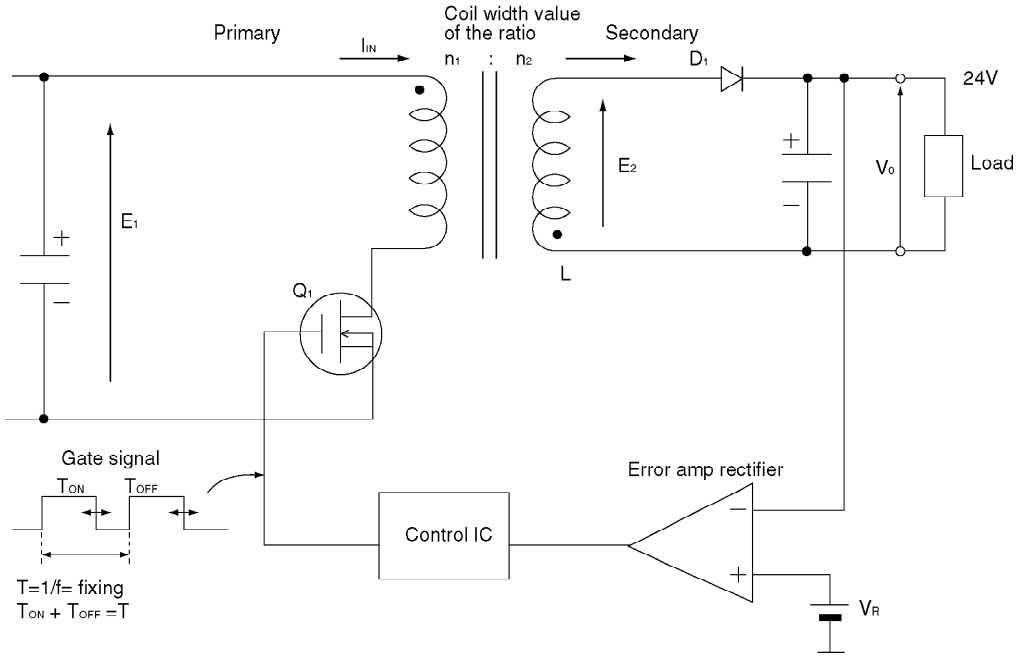
7.16. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

[Input Circuit]
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]
The input current is rectified by D101~ D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]
Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.

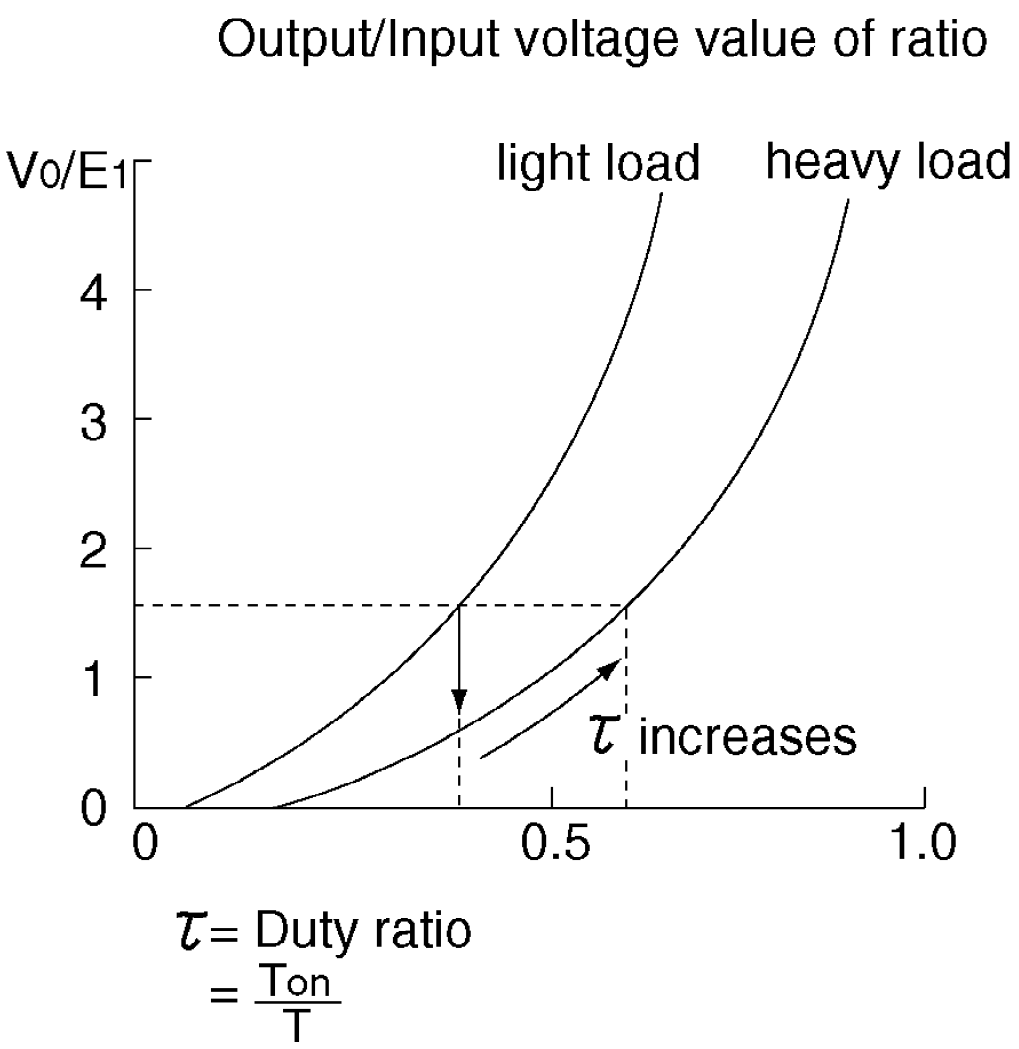


The following is an overview of how the power supply unit is controlled.
The control method of this power supply unit is pulse width modulation.
When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transfer as follows.

L → D_1 → Load → L

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes

too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.
Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.



[Surge Absorber Circuit]
This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]
The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.
In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.
When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]
The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)
Refer to POWER SUPPLY BOARD SECTION,] ().

8. REFERENCE MATERIALS DATA

8.1. PRINTING OPERATION PRINCIPLE

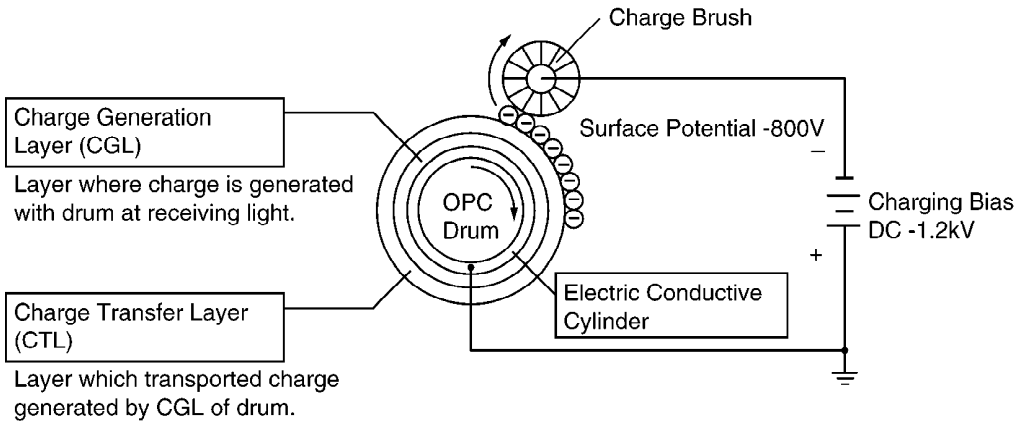
8.1.1. PROCESS CHART AND PROCESS BIAS

8.1.2. CHARGING

Charging is the stage that keeps the surface of the sensitive drum a fixed electric potential. The sensitive drum is the Organic Photo Conductor (OPC), which is a electric conductive cylinder whose surface is covered with the Charge Generation Layer (CGL) and Charge Transfer Layer (CTL).

When the charging bias (DC -1.0 kiev) is added and the minus charge is supplied to the charge brush while charging, the whole surface potential of the drum is -600V.

Charging Part

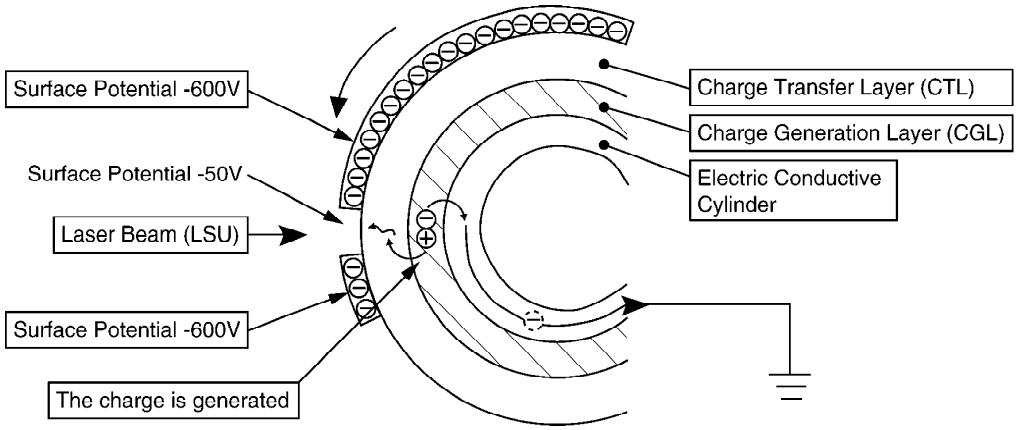


8.1.3. EXPOSING

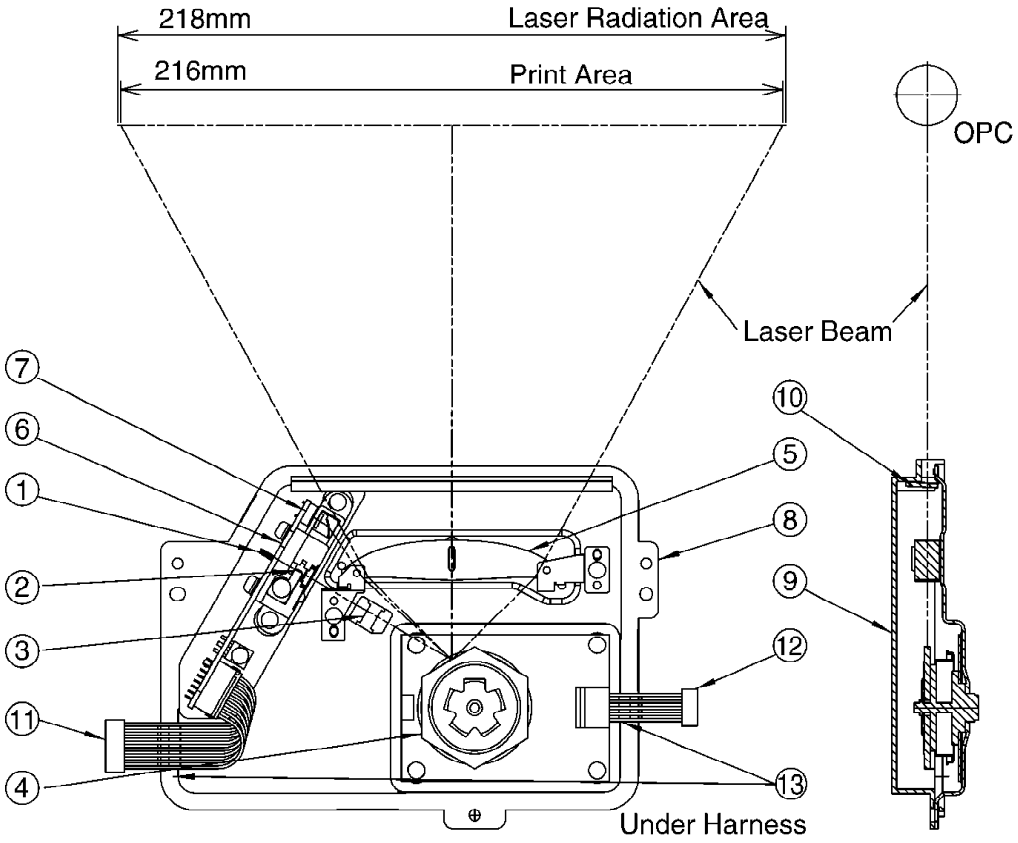
When the drum which is charged with the fixed electric charge is irradiated by the laser beam, the plus charge and minus charge are generated at the Charge Generation Layer. Passing through the Charge Transfer Layer which conducts the plus charge, the minus-charged drum's surface is neutralized to be skipped. Then the minus charge goes to the ground from the electric conductive cylinder. Consequently the charge of the part which is not exposed remains as it is, and the electric potential of the scanned part changes.

At that time an invisible image is created on the drum.

Exposing Part



8.1.4. LASER SCANNING UNIT LOCATIONS



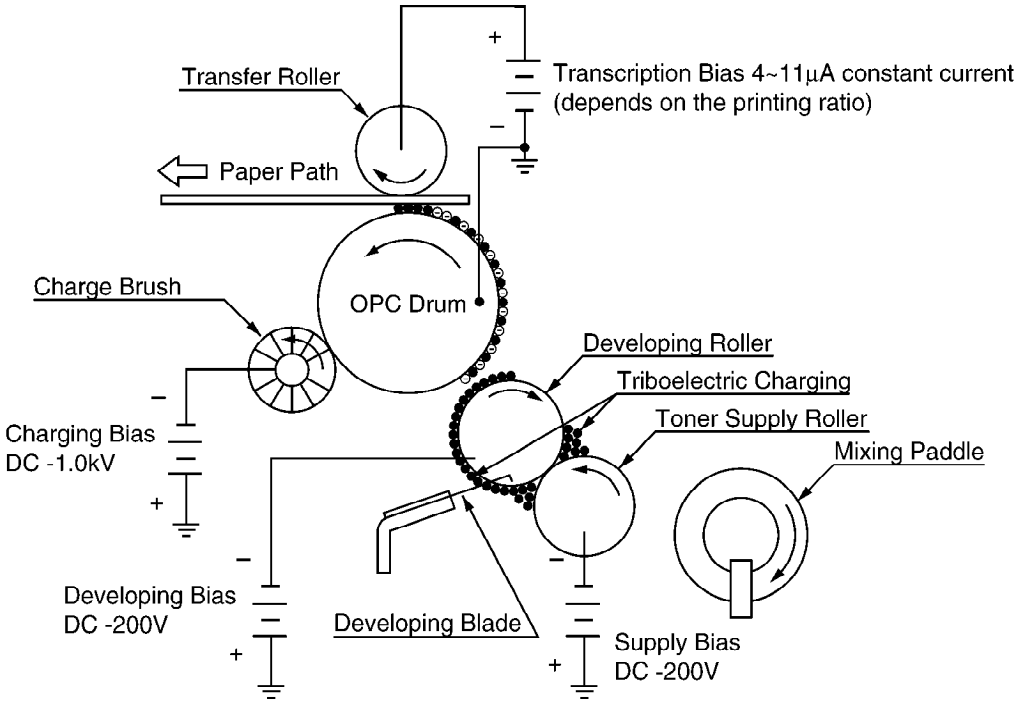
	Parts Name		Parts Name
1	Laser Diode	8	Frame
2	Collimator Lens	9	Cover
3	Cyrindorical Lens	10	Cover Glass
4	Polygon Motor Unit	11	LD Harness
5	f θ Lens	12	Motor Harness
6	LD Driving Circuit	13	Sponge
7	Pin Photodiode		

8.1.5. DEVELOPING AND TRANSCRIPTION

The developing is the stage that the OPC drum with an invisible image is changed to visible by the toner. The developer consists of mixing paddle, toner supply roller, developing roller, developing blade and OPC drum. The bias voltage is added to the developing roller (DC -200V) and toner supply roller (DC -200V). Firstly the toner is mixed up in the mixing paddle and minus-charged by triboelectricity, then led to the toner supply roller. Secondly the potential difference causes to send the toner to the developing roller from the toner supply roller. The supplied toner to the developing roller is kept to a certain layer thickness by the developing blade and also it is charged by triboelectricity. Consequently the toner is transferred to the surface of the exposed OPC drum by the potential difference between the developing roller and OPC drum's surface.

The transfer is the stage that the created image on the OPC drum is transferred to the paper. When the transfer roller is plus-charged with the image, the minus-charged toner particles are gathered on the surface of the drum and transferred to the paper.

Developing and Transcription Part

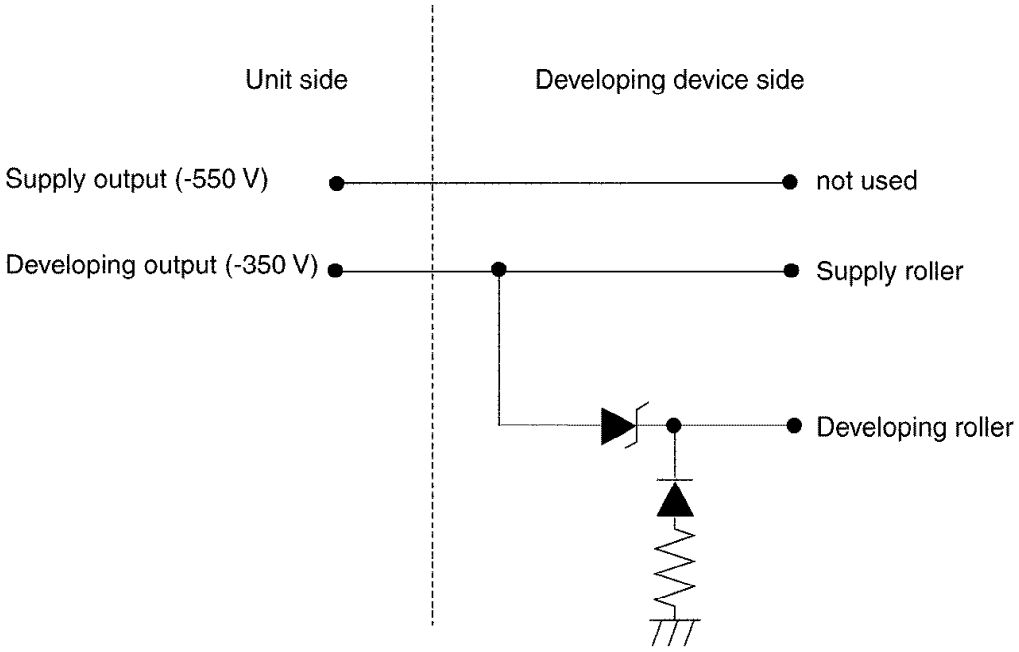


The values of developing bias and supply bias are different from the ones described in the Service Manual for FL501.

The biases output from the unit of FL501,FLM551 and FLB751(FLB750) have the same voltage. However, the developing device of FA78X(FA78A) converts the developing and supply biases inside the developing device to improve the image quality.

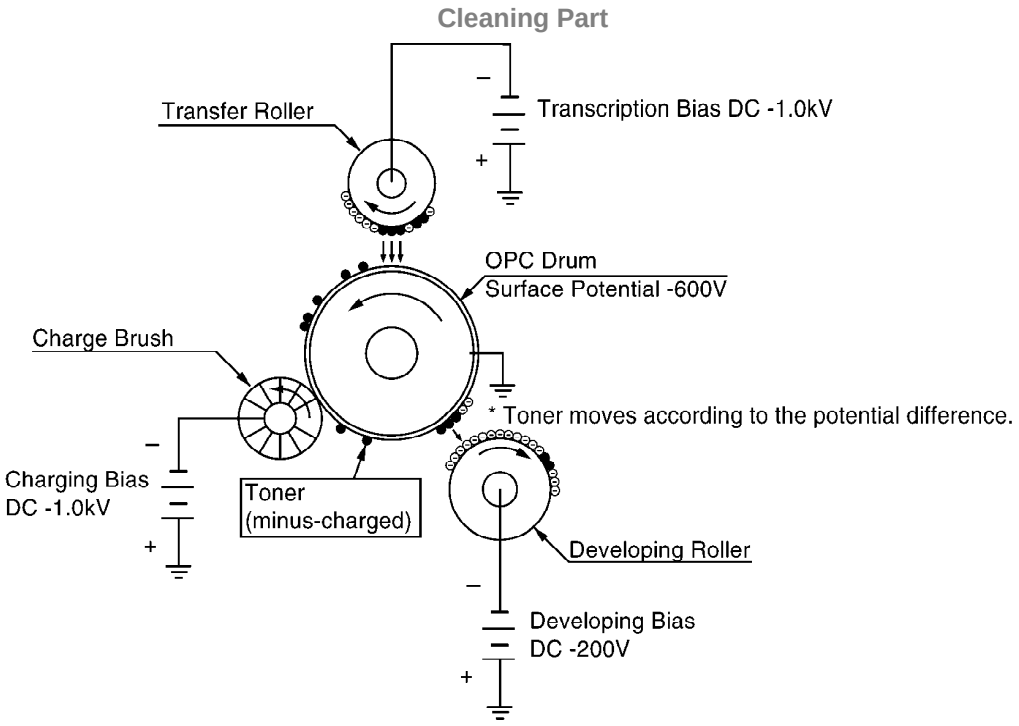
	FA77X(FA77A) developing device	FA78X(FA78A) developing device	FA73X(FA73A/FA73E) developing device
Developing bias	**-350V**	**-180V**	**-200V**
Supply bias	**-550V**	**-350V**	**-200V**

Inside voltage conversion circuit of the developing device



8.1.6. CLEANING

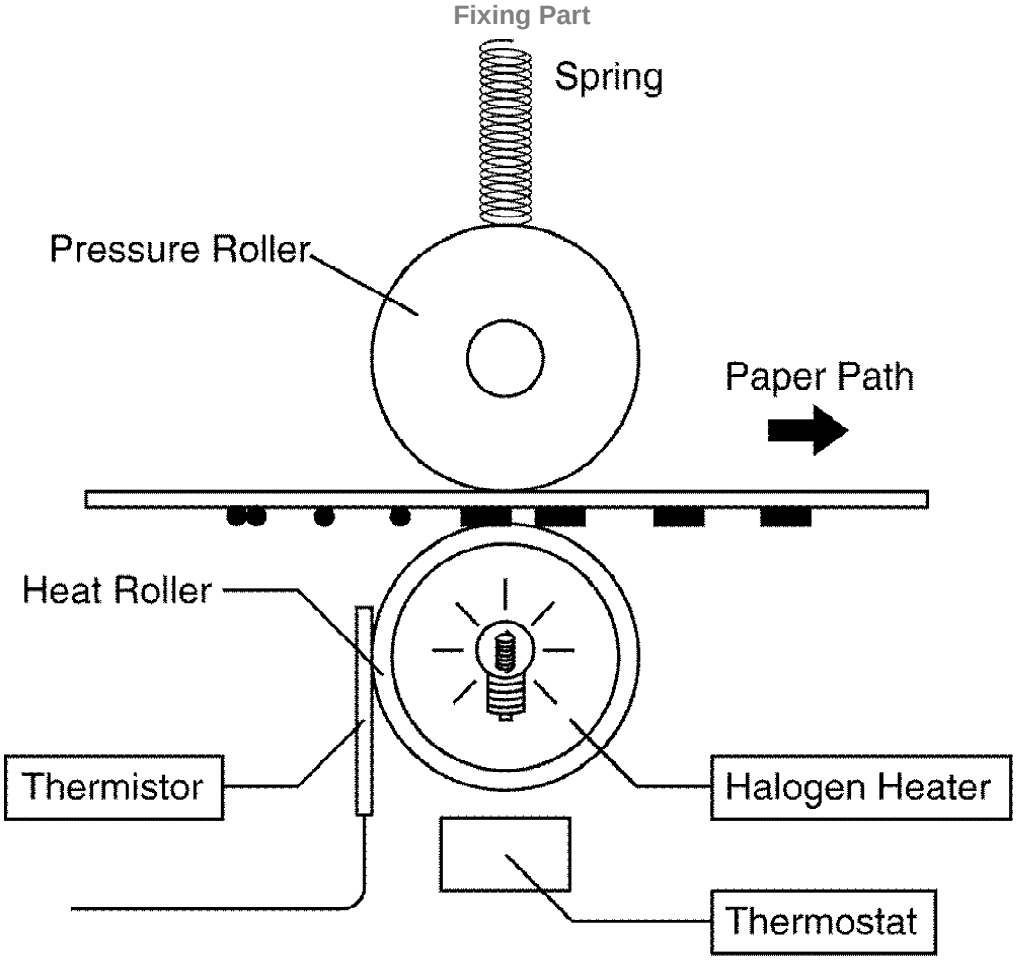
The toner attached to the surface of the OPC drum is transferred to the paper at the transcription stage, but a part of the toner remains. The cleaning is the stage that cleans the remain toner after the transcription stage. The remain toner on the drum and the toner which was attached to the place where the laser beam didn't scan are gathered to the developing roller to be used again. When no paper is supplied, the transfer roller is minus-charged to eliminate the minus-charged toner.



8.1.7. FIXING

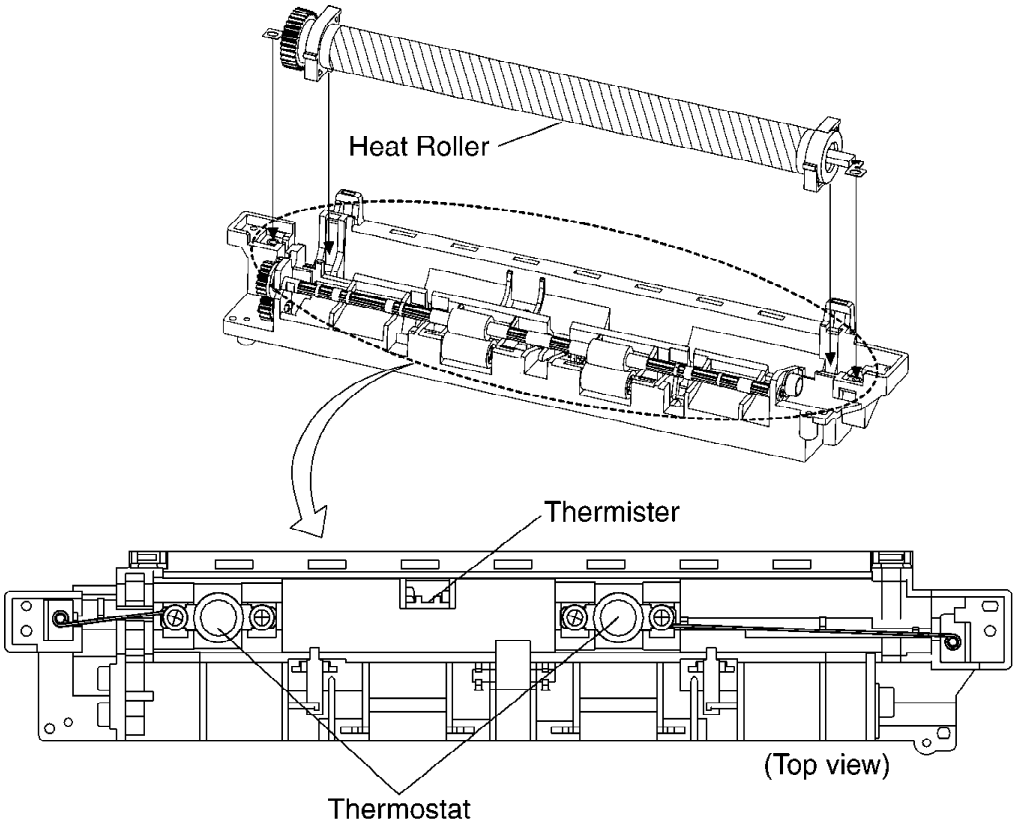
On the process of the transfer, the transferred toner is weakly attached on the paper. Fixing means the process to fix the toner on the paper permanently. The fixing part melts the toner at

the high temperature using the halogen heater. The toner is fixed on the paper by the heat and pressure through the fixing part with the image. The surface of the heat roller is rosined by Teflon and lubricated to prevent from attaching the toners. The press roller is made of silicon, and its spring compresses the melted toner.



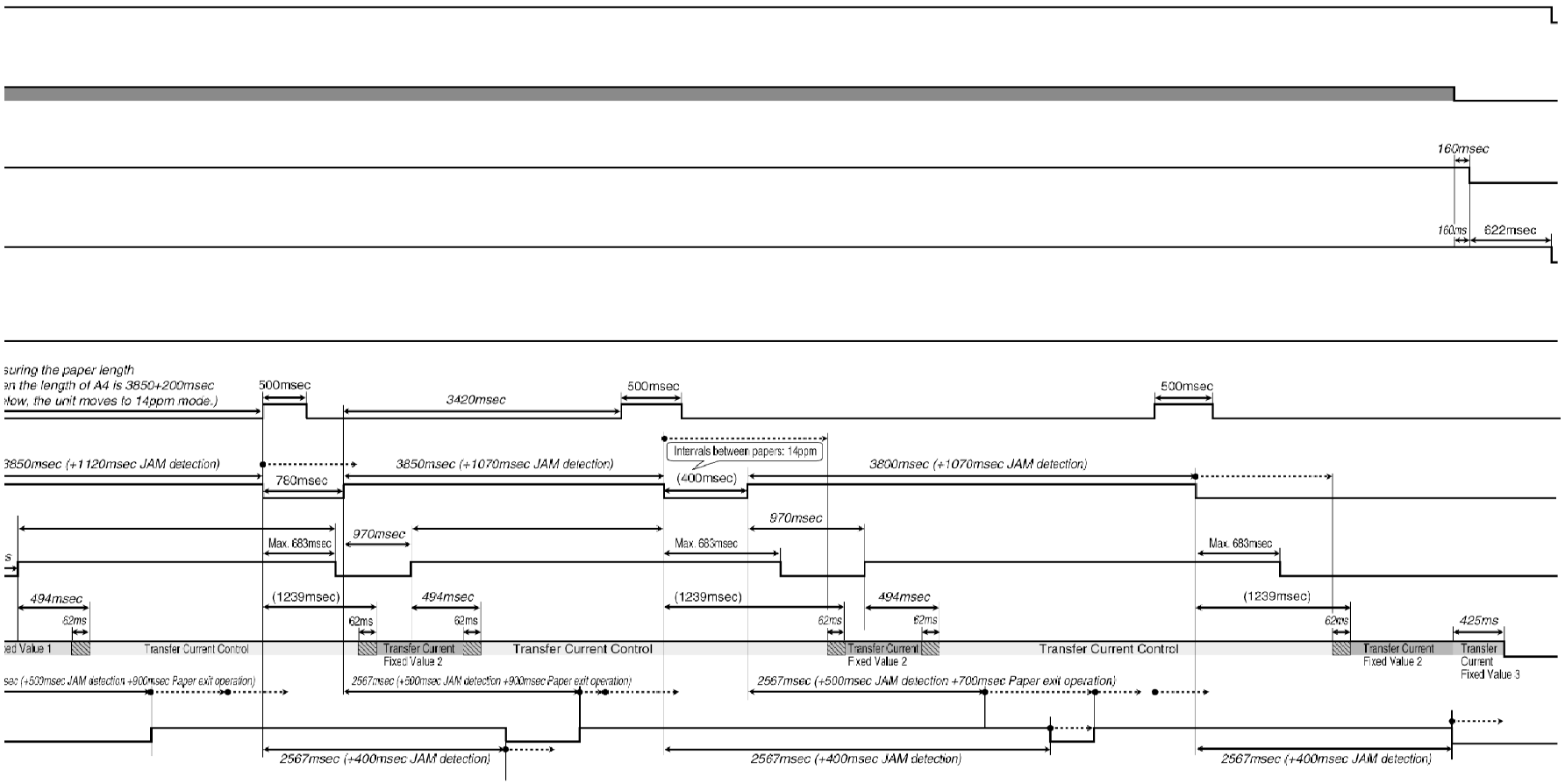
The fixing part becomes high temperature, so the thermistor and the thermal fuse are provided.

1. **Thermistor**
   The thermistor touches the heat roller and check the temperature to feed back to the control circuit. The surface temperature should be kept 160 °C while printing.
2. **Thermostat**
   The thermostat takes the same role with the thermal fuse. The thermostat is located near the heat roller, and it turns OFF the power when the temperature around the thermostat becomes over 135°C.

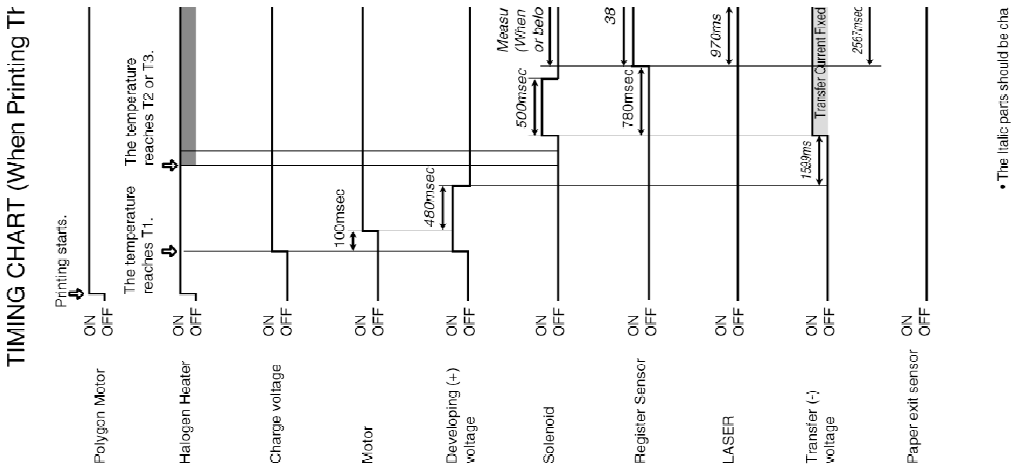


8.1.8. TIMING CHART (When Printing Two Sheets of Paper) BASIC

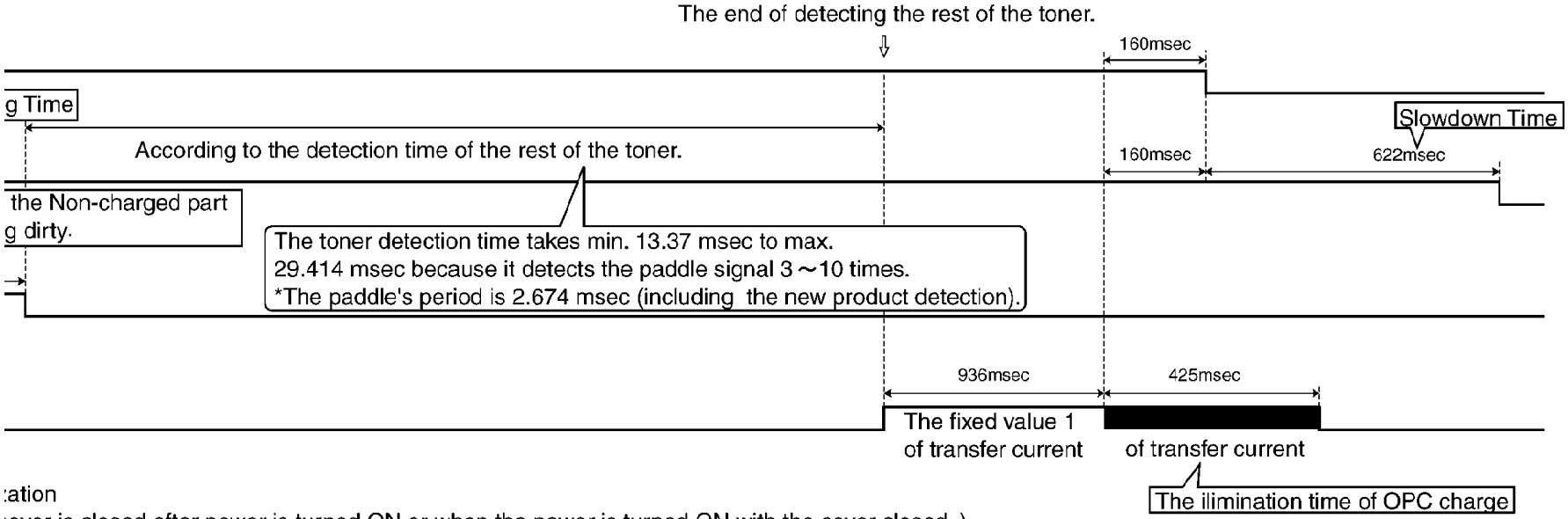
Three Sheets of Paper) for FL541



hanged with service function.



8.1.9. Timing Chart [Initializing (Long)]

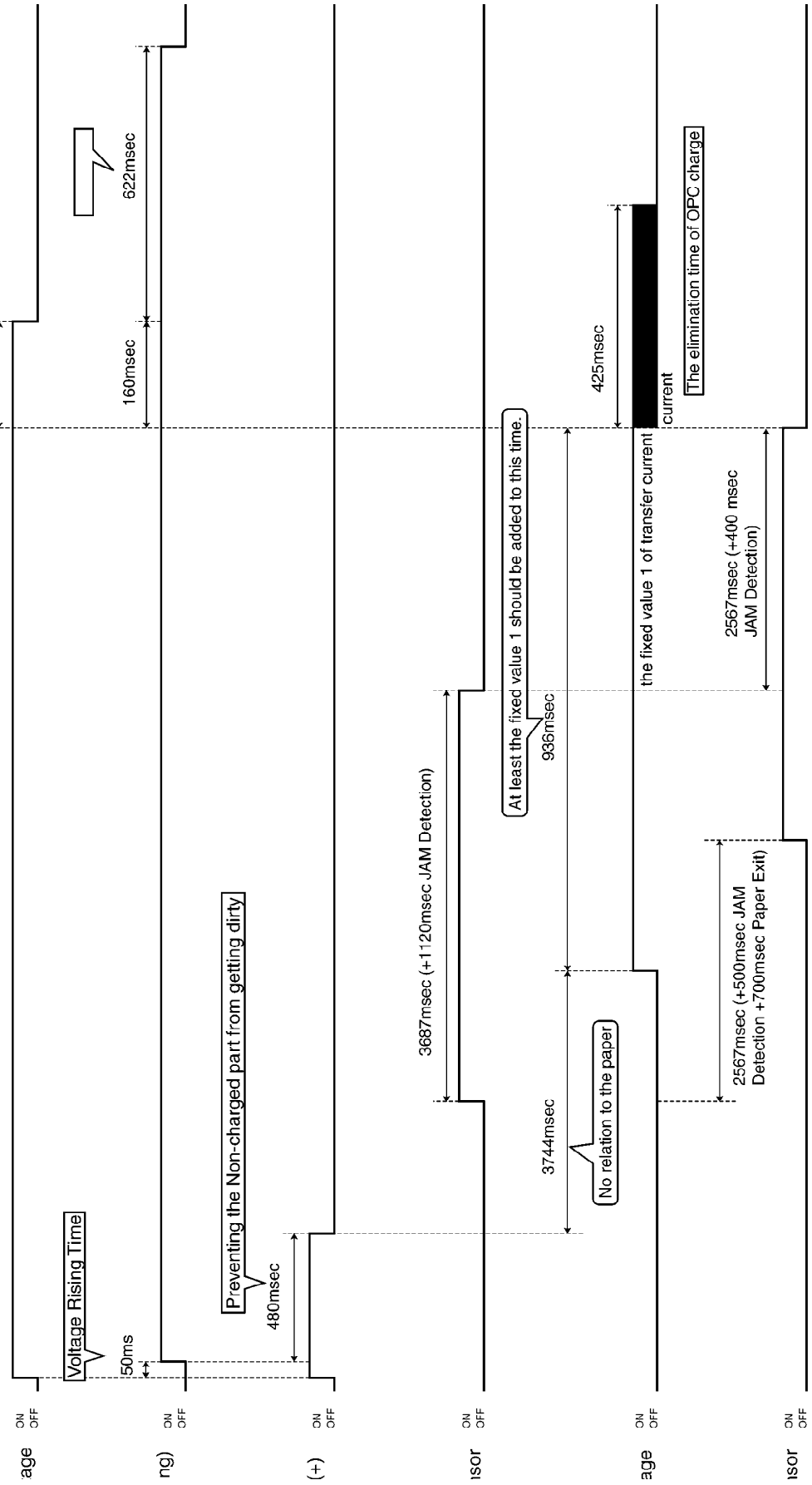


:ation
:over is closed after power is turned ON or when the power is turned ON with the cover closed.)
leveloper is removed. (When the cover is closed after the developer is removed.)
:over is closed after the toner becomes LOW.
:over is closed after the Jam is released.
:D PICK UP is released. The initialization of the pick up roller position
e/day

it the abnormal paddle signal is detected during initialization,
forced to stop without completion processing,
hand when it is detected during printing the process will be completed as usual.

To prevent the unit from being destructed by the OPC transfer voltage

8.1.10. Timing Chart (when the registration sensor is turned OFF then ON during initializing)


160msec
622msec
160msec
425msec
current
The elimination time of OPC charge
Voltage Rising Time
50ms
Preventing the Non-charged part from getting dirty
480msec
3687msec (+1120msec JAM Detection)
At least the fixed value 1 should be added to this time.
936msec
the fixed value 1 of transfer current
2567msec (+400 msec
JAM Detection)
3744msec
No relation to the paper
2567msec (+500msec JAM
Detection +700msec Paper Exit)
ON
OFF
age
ng)
(+)
isor
age
isor

Charge Volta

Main (Paper Feedin
Motor HB (24V)

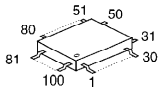
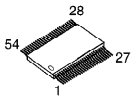
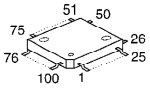
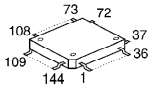
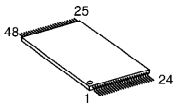
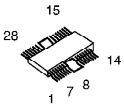
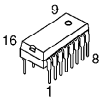
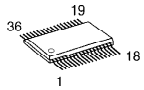
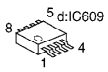
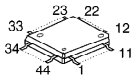
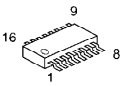
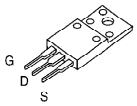
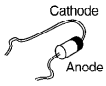
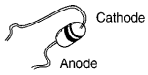
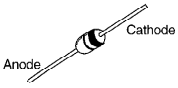
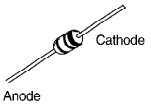
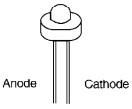
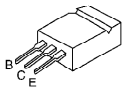
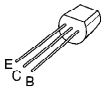
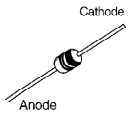
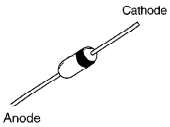
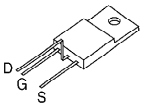
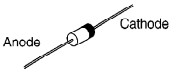
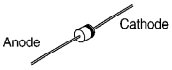
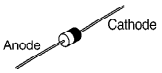
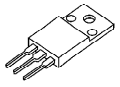
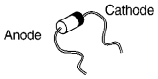
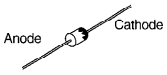
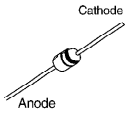
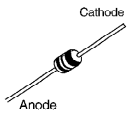
Development (-
Voltage

Register Sens

Transfer Volta

Paper Exit Sens

8.2. TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

 C5CB00000053	 C3ABQG000069	 C1CB00001566	 C1CB00001551	 PFWIFL541M
 C0DBFGD00012	 C0GBH0000015	 PFVIT2003APS	 C0JBAR000386	 AN6383SB
 PQVINJM4558M/ PQVIMC34119D	 C1ZBZ0002089	 AN6742S	 PFVIFA5317P	 PFVIPQ05RD11
 PQVDNNCD56DT	 2SB1322	 PQVTDTC143E/ 2SB1197K/ PQVTD143Z106/ 2SD1819A	 PQVDRLS73T/ PFVDRMRLS245	 B0JAME000005
 MA7160	 PFVDRMRLS245/ PQVDRLS73T/ 1SS133	 MA4056	 PQVDSLR325MC/ PQVDR325CA47	 2SD2137A
 2SA1699	 2SB709A	 PFVDRD62ESAB	 PFVDRD150EB	 2SK2543
 2SC1740S	 h:PFVDDHM3FJ60/ PFVDDHM3M20/ PFVDGPP20JT3	 PFVDERA1504	 PFVD05NU42/ PSVD10ELS4	 PFVDYG901C2R
 PFVD21DQ04	 PFVDERA9102	 MA4300/MA4180	 MA4062N	

8.3. HOW TO REPLACE A FLAT PACKAGE IC

8.3.1. PREPARATION

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 662°F ± 50°F (350°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

Recommended Flux: Specific Gravity → 0.82.

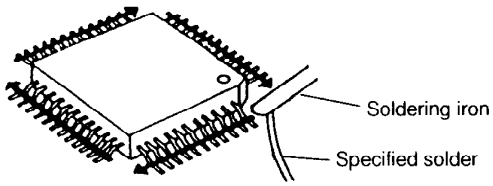
Type → RMA (lower residue, non-cleaning type)

Note:

See ABOUT LEAD FREE SOLDER (PbF: Pb free) ().

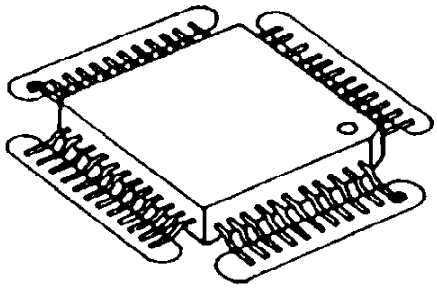
8.3.2. PROCEDURE

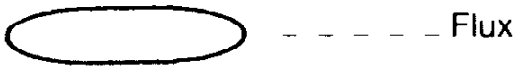
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



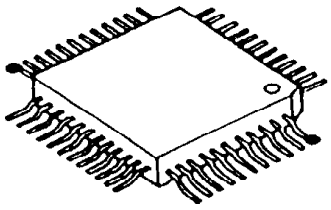
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.





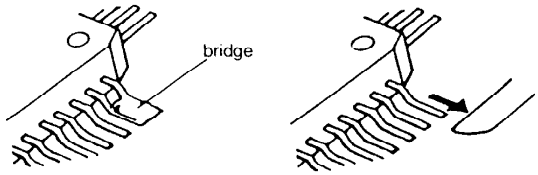
3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.





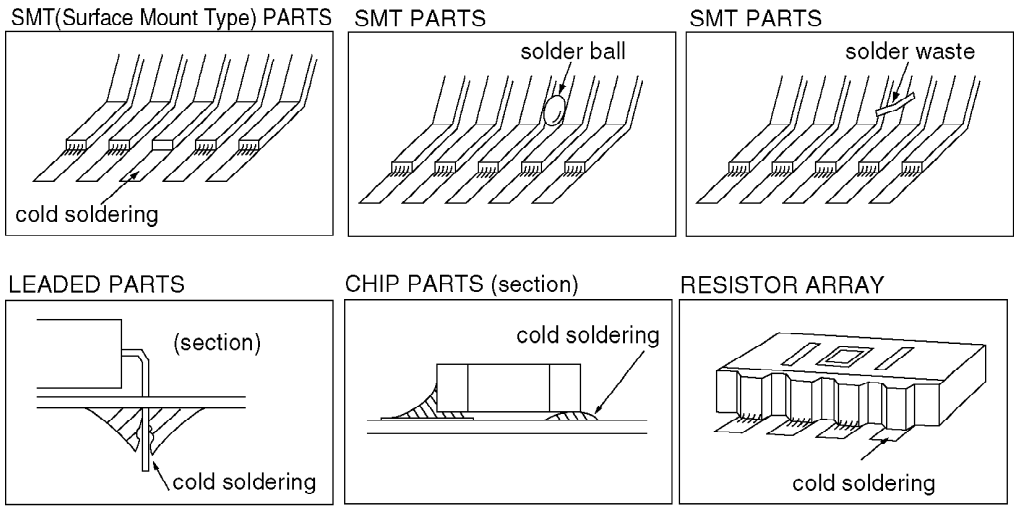
8.3.3. REMOVING SOLDER FROM BETWEEN PINS

1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



8.4. DIGITAL BOARD SECTION

When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)
The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during

transport.

2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

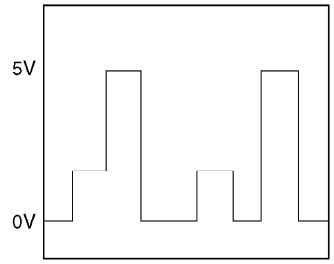
Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially, DRAM and ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.

Don't replace ICs or stop repairing until checking the signal lines. An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

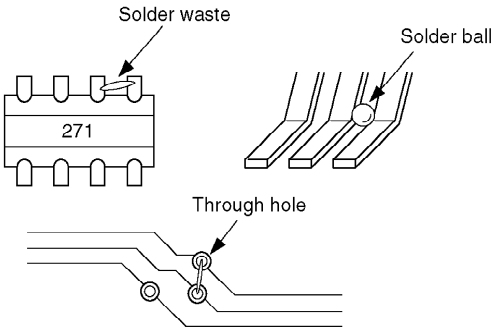
What are the main signals for booting up the unit?
Please refer to DIGITAL BLOCK DIAGRAM ().
The ASIC (IC606) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC607), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.
It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.
These signal lines are all controlled by voltages of 3.3V (H) or 0V (L).

8.4.1. NG EXAMPLE

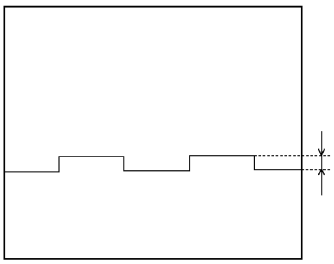
1.



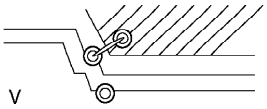
Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.



2.

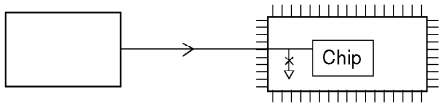


Short between the signal line and GND.

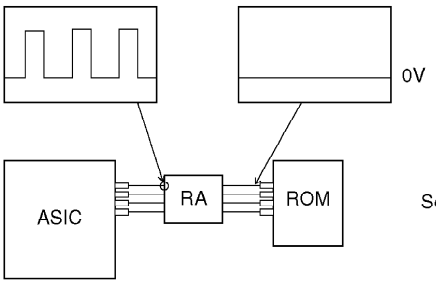


Approx. 0 or 1 V

OR IC malfunction



3.



Solder fault on RA.

8.5. MODEM SECTION

8.5.1. FUNCTION

The unit uses MODEM (IC600) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.
During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. MODEM has hardware which sends and detects all of the necessary signals for FAX communication.
It can be controlled by writing commands from the ASIC (IC606: inside ASIC).
This MODEM also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.
Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON CCITT (International Telegraph and Telephone Consultative Committee)

The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines. Determined in 1968.

Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

Methods to suppress redundancy are not used.

Determined in 1976.

- Group III (G3)

Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

Determined in 1980.

- Group IV (G4)

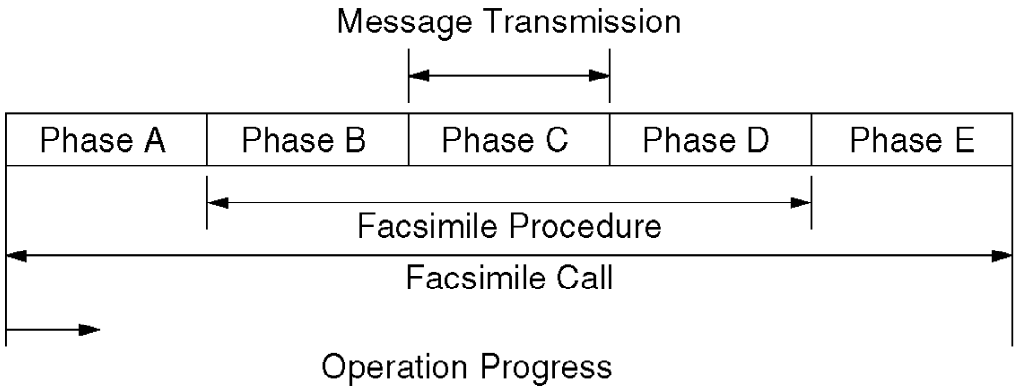
Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series

is divided into five phases.



Phase A : Call setting
Call setting can be manual/automatic.
Phase B : Pre-message procedure
Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.
Phase C : Message transmission
Phase C is the procedure for the transmitting facsimile messages.
Phase D : Post message procedure
Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.
Phase E : Call retrieval
Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time
[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]
Transmission time consists of the following.

Control time:
This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:
This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:
This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

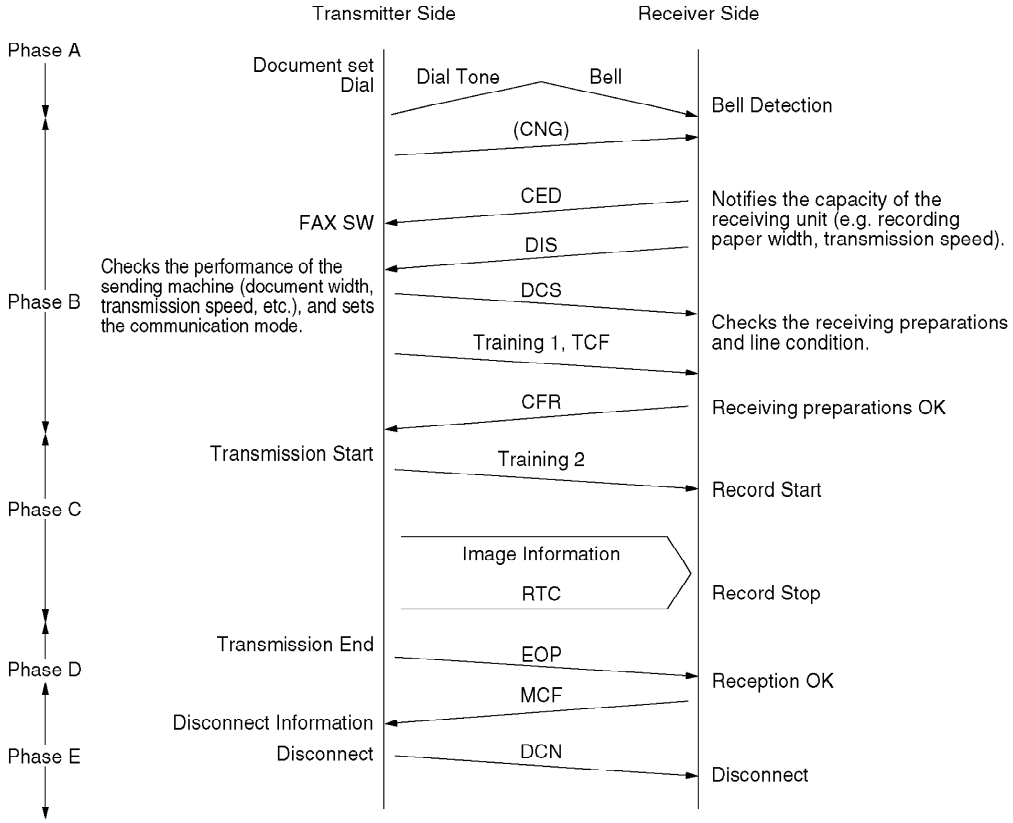
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension: MH Mode 2 dimension: MR Mode (K=2.4)
Resolution	Main Scan: 8 pel/mm Sub Scan: 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value: 10, 20 Can be recognized in 40ms.

6. Explanation of Communication and Compression Technology

A. G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. An example of a binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal)

Identification Signal Format.....00000001

Function:

Notifies the capacity of the receiving unit. The added data signals are as follows.

Signal.....DCS (Digital Command Signal)

Identification Signal Format.....X1000001

Example

(Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0, 1, 0, 0	V.27 ter	4800 bit/s, V.27 ter
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 ter and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	V.27 ter and V.29 and V.33	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 ter and V.29 and V.33 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/ 25.4mm	R8×7.7 lines/mm and/or 200×200 p 25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capabilit

Bit No.	DIS/DTC	DCS
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of	1728 picture elements along scan length of
(0, 1)	215 mm ± 1%	215 mm ± 1%
	1728 picture elements along scan line length of	2432 picture elements along scan length of
	215 mm ± 1%	303 mm ± 1%
	2048 picture elements along scan line length of	
(1, 0)	255 mm ± 1%	
	2432 picture elements along scan line length of	2048 picture elements along scan length of
	303 mm ± 1%	
(1, 1)	1728 picture elements along scan line length of	255 mm ± 1%
	215 mm ± 1%	
	2048 picture elements along scan line length of	Invalid
	255 mm ± 1%	
	Invalid	
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23	Minimum scan line time capability of the	Minimum scan line time
(0, 0, 0)	receiver	20 ms
(0, 0, 1)	20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	40 ms
(0, 1, 0)	40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	10 ms
(1, 0, 0)	10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	5 ms
(0, 1, 1)	5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	
(1, 1, 0)	10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 0, 1)	20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 1)	40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
	0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to “0”.	Frame size 0 = 256 octets 1 = 64 o
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PST
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field

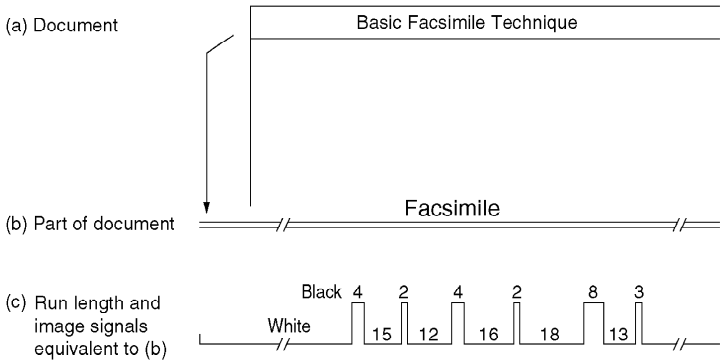
Bit No.	DIS/DTC	DCS
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits Recording width indicated by this information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 pict elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 pictu elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/ 25.4 mm	R16×15.4 lines/mm and/or 400×40 25.4 mm
44	Inch based resolution preferred	Resolution type selection “0”: neuritic based resolution “1”: inch based resolution
45	Metric based resolution preferred	Don’t care
46	Minimum scan line time capability for higher resolutions “0”: $T_{15.4} = T_{7.7}$ “1”: $T_{15.4} = 1/2T_{7.7}$	Don’t care
47	Selective Polling capability	Set to “0”.
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability: Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability: Index of cooperation (IOC)=264.
Note 3 - Standard facsimile units conforming to T.4 must have the following capability: Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	————————	A fixed pattern is transmitted to the receiving at a speed (2400 to 14400 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this si
TCF (Training Check)	————————	Sends 0 continuously for 1.5 seconds at the speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly rece FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiate training once again.
Training 2	————————	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	————————
RTC (Return to Control)	————————	Sends 12 bits (0...01 × 6 times) to the receive the same speed as the image signal and noti completion of transmission of the first sheet
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If ther still more documents to be sent, they are out instead of EOP. After MCF reception, the sen transmits an image signal of the second she
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is receiv

B. Redundancy Compression Process Coding Mode

This unit uses one-dimensional MH format.



Modified Huffman (MH) Code		
Run length	Code for White Line	Code for Black Line
0	00110101	0000110111
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

(d) Codification of (c) according to MH formula

00110111101010 (White 400) 011 (Black 4) 110101 (White 15) 11 (Black 2) 001000 (White 12) 011 (Black 4) 101010 (White 16)

11 (Black 2) 0100111 (White 18) 000101 (Black 8) 000011 (White 13) 10 (Black 3)

(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

8.6. TEST CHART

8.6.1. ITU-T No.1 TEST CHART

THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

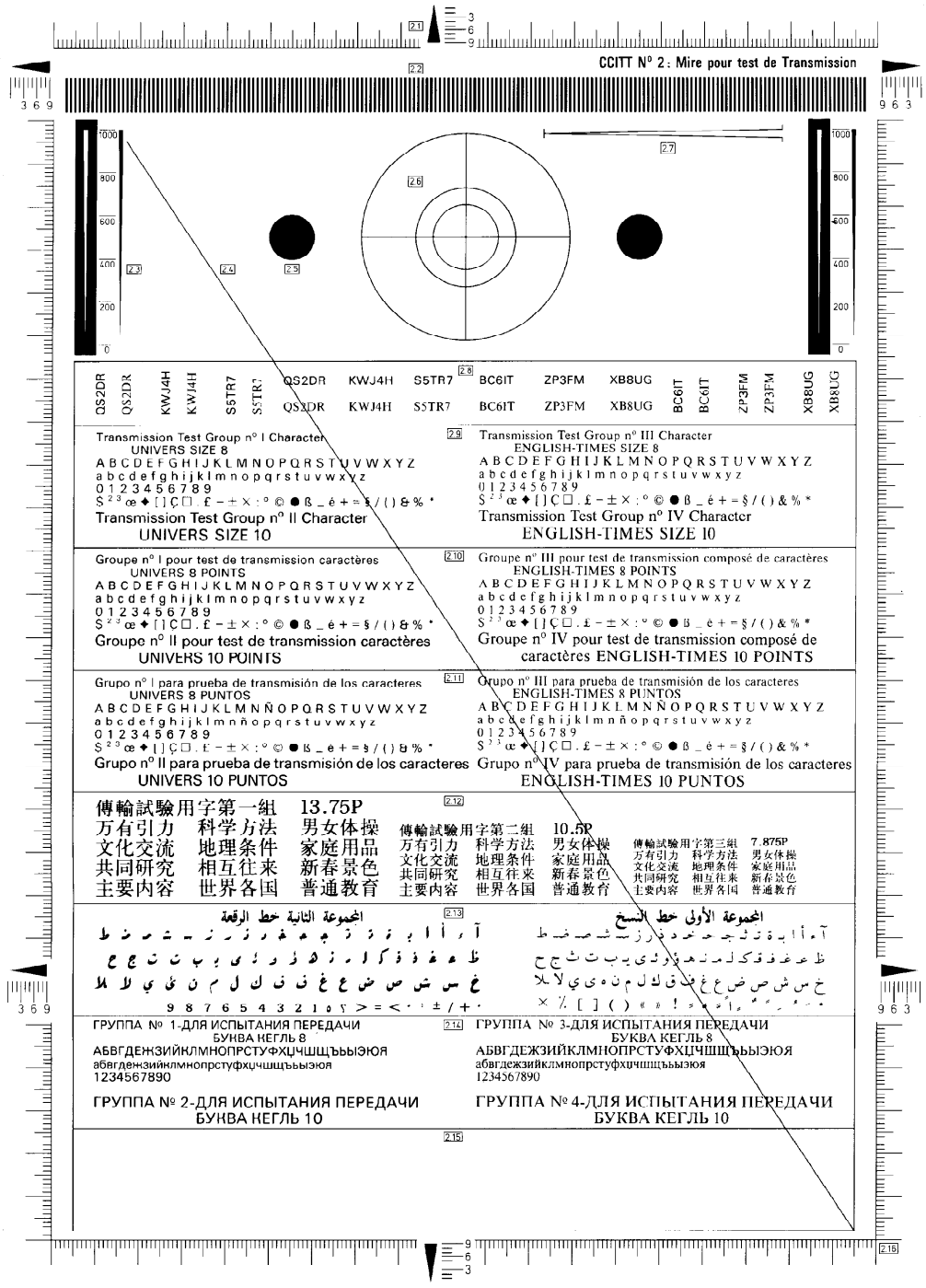
Yours sincerely,

Phil.

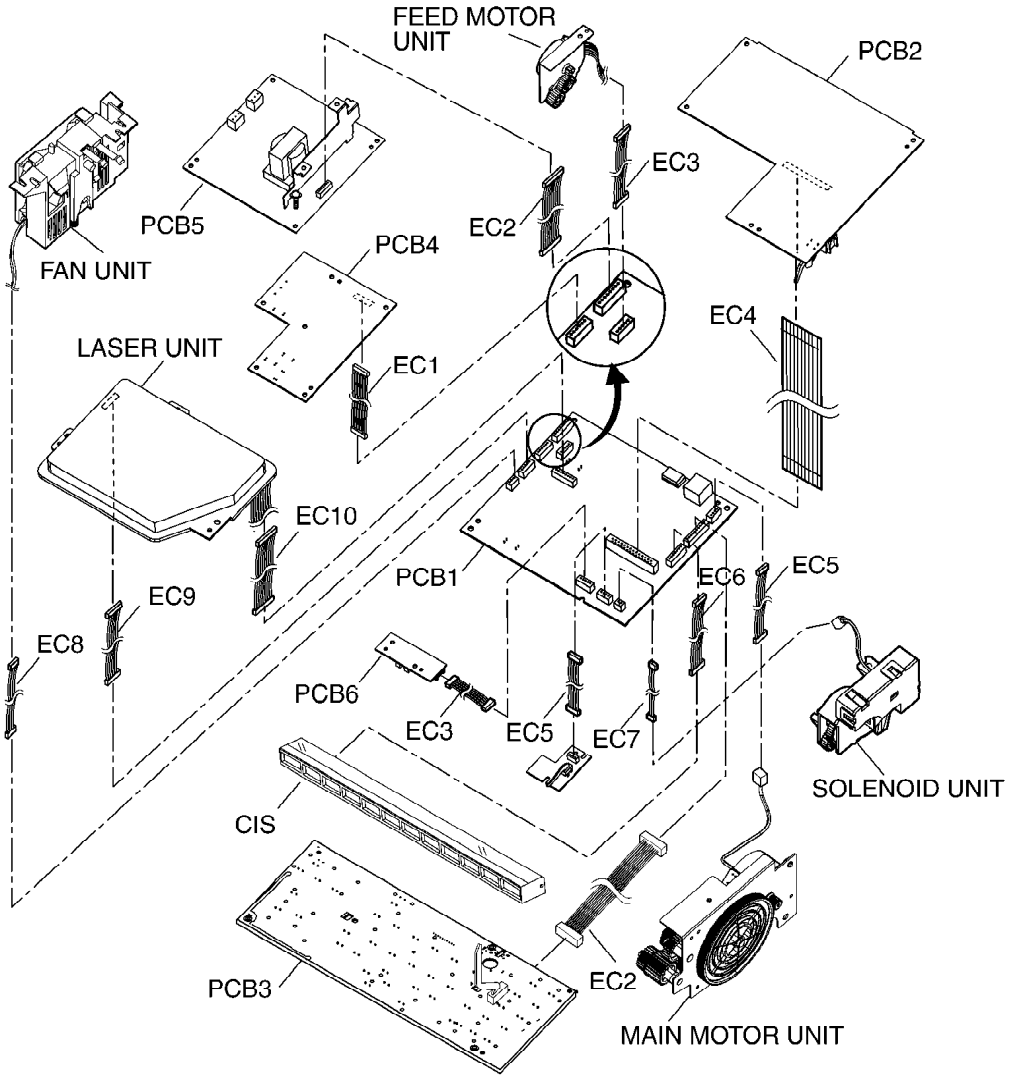
P.J. CROSS
Group Leader - Facsimile Research

Registered in England: No. 2038
Registered Office: 60 Vicars Lane, Ilford. Essex.

8.6.2. ITU-T No.2 TEST CHART

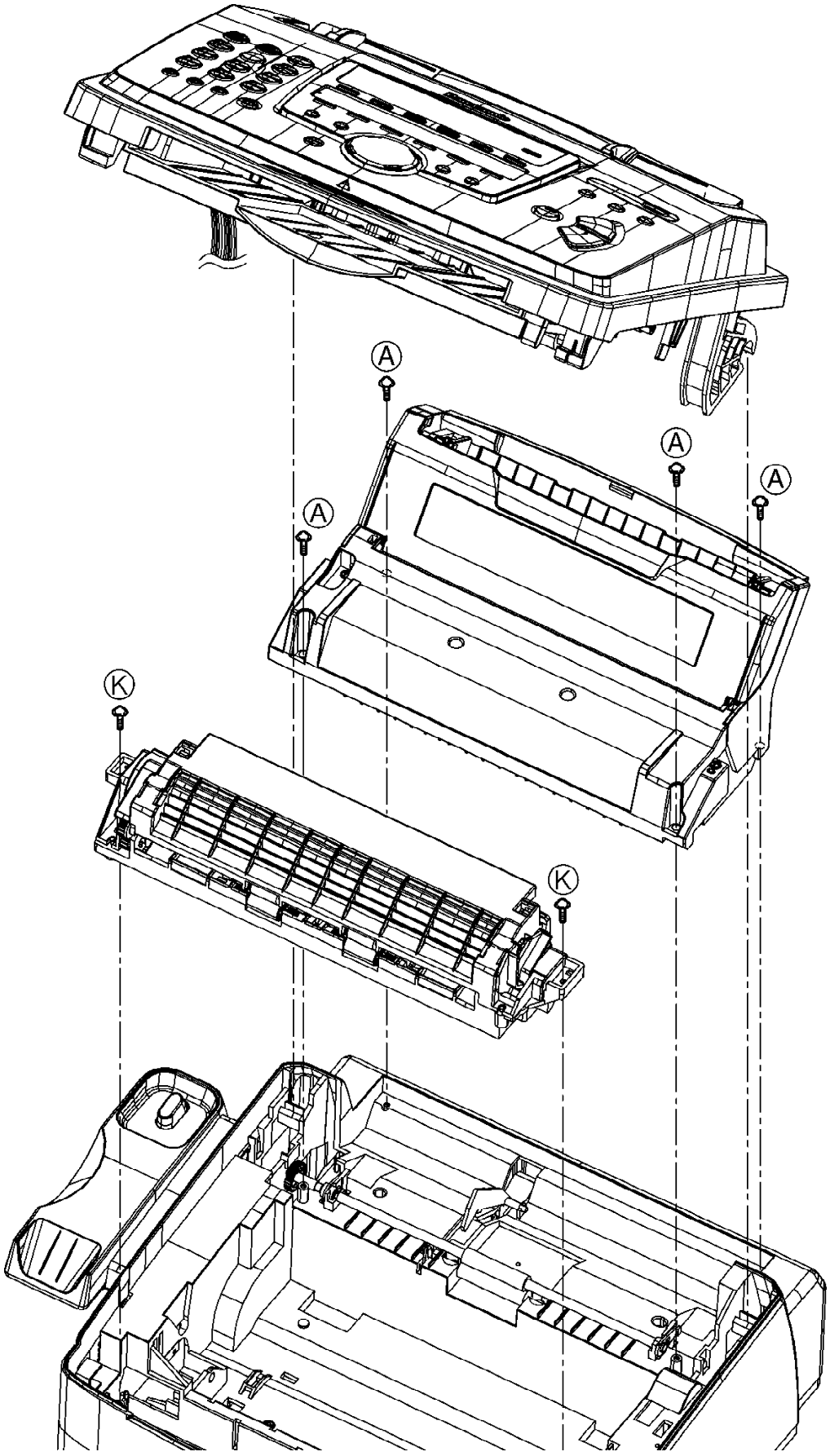


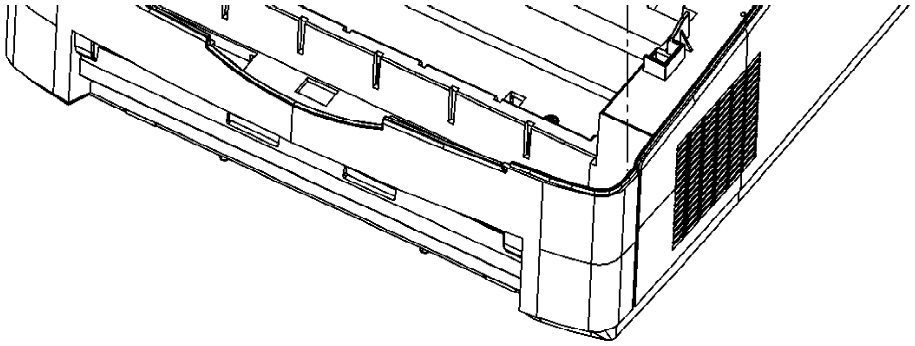
9. FIXTURES AND TOOLS



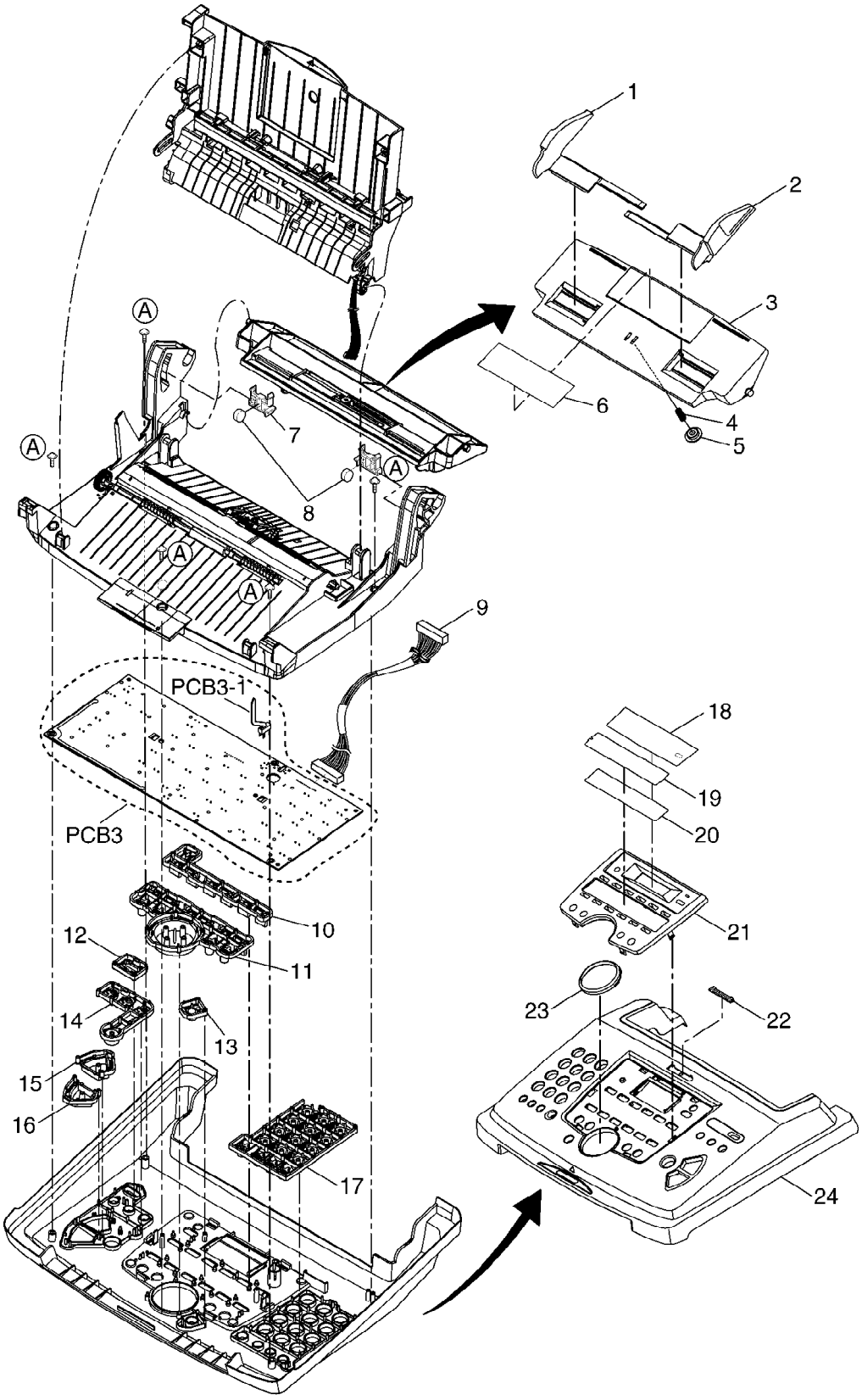
10. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

10.1. GENERAL SECTION

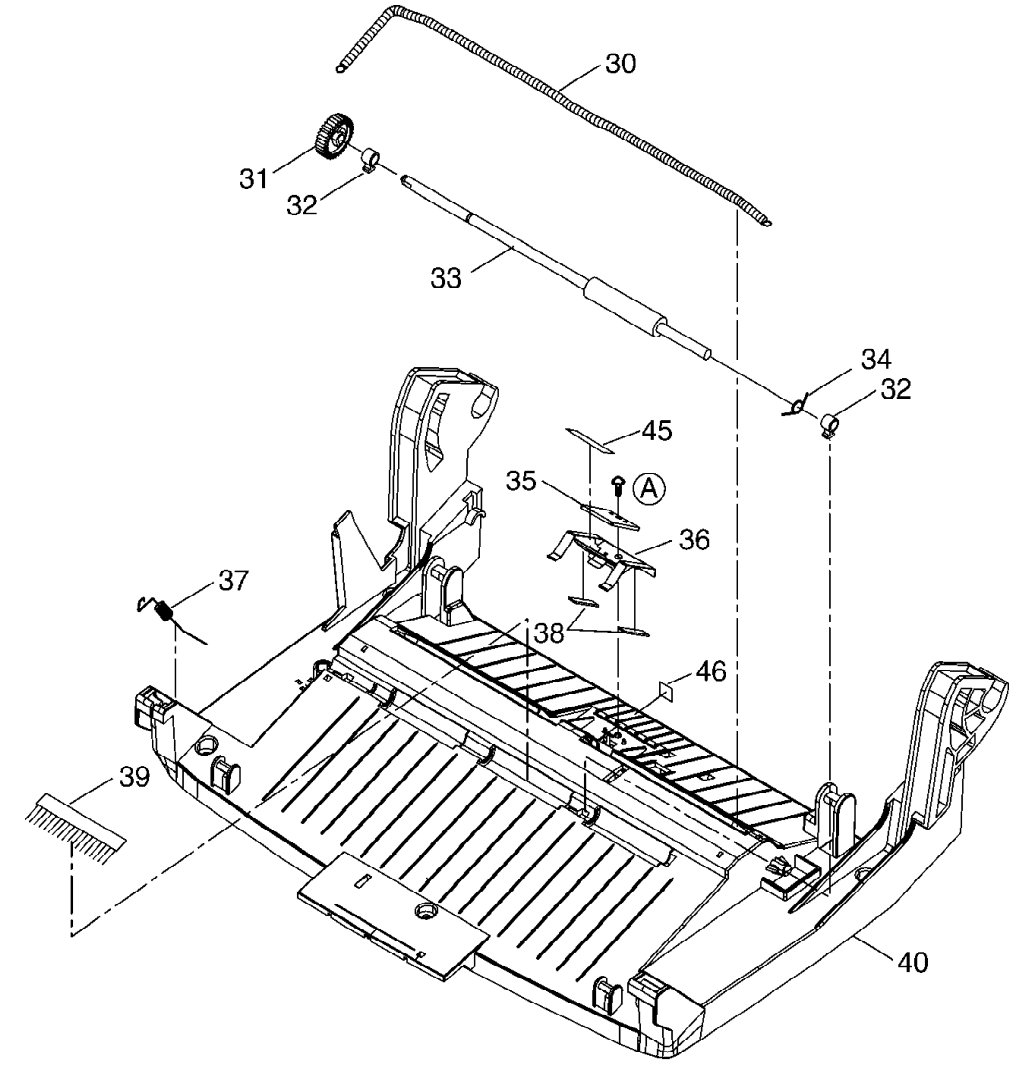

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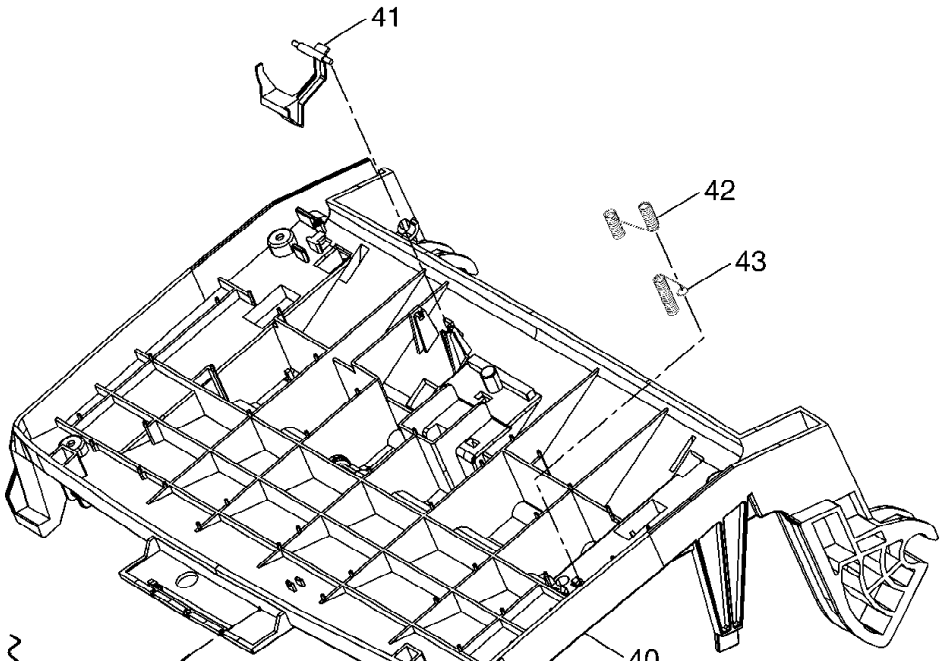


10.2. OPERATION COVER SECTION (1)



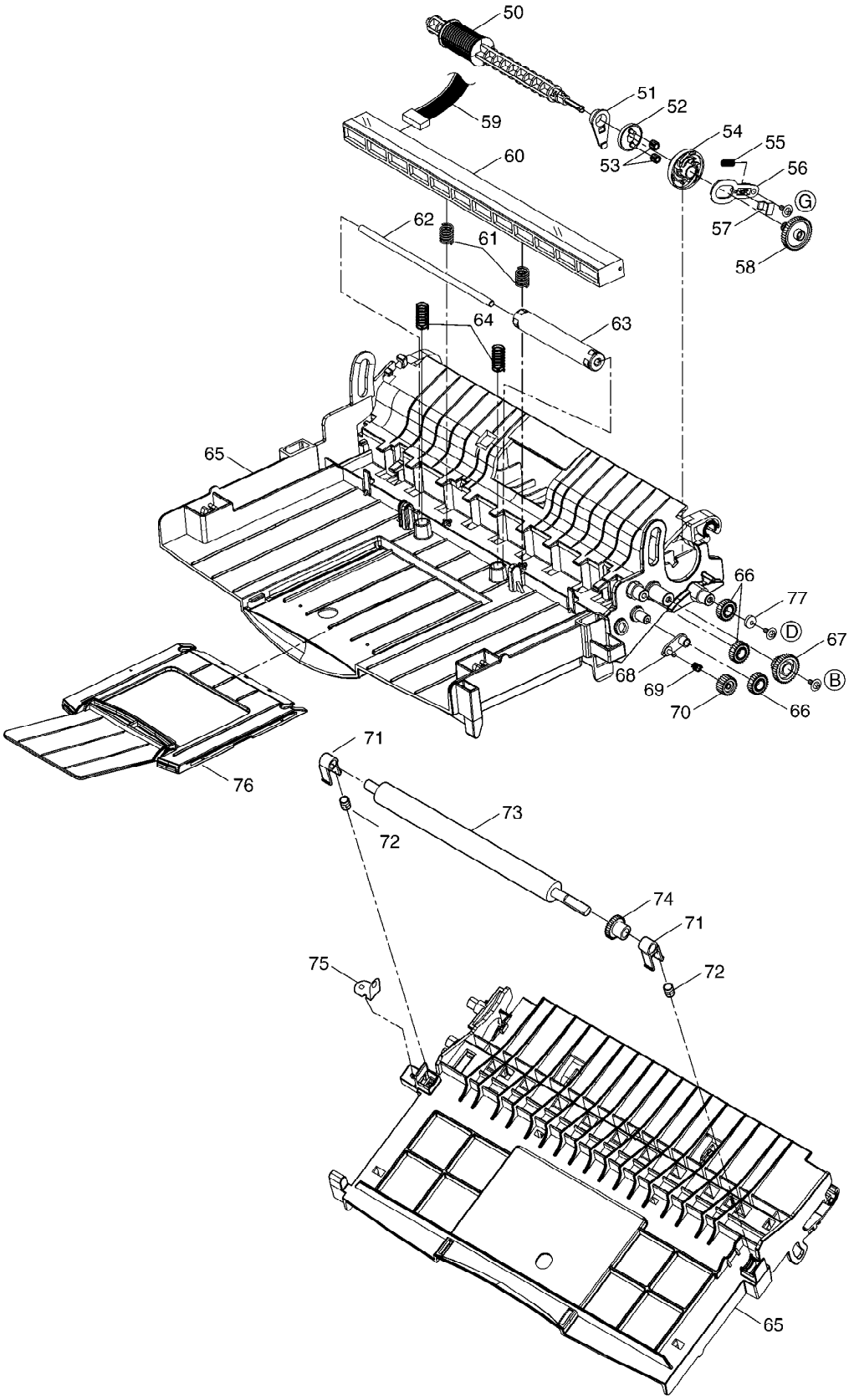
10.3. OPERATION COVER SECTION (2)


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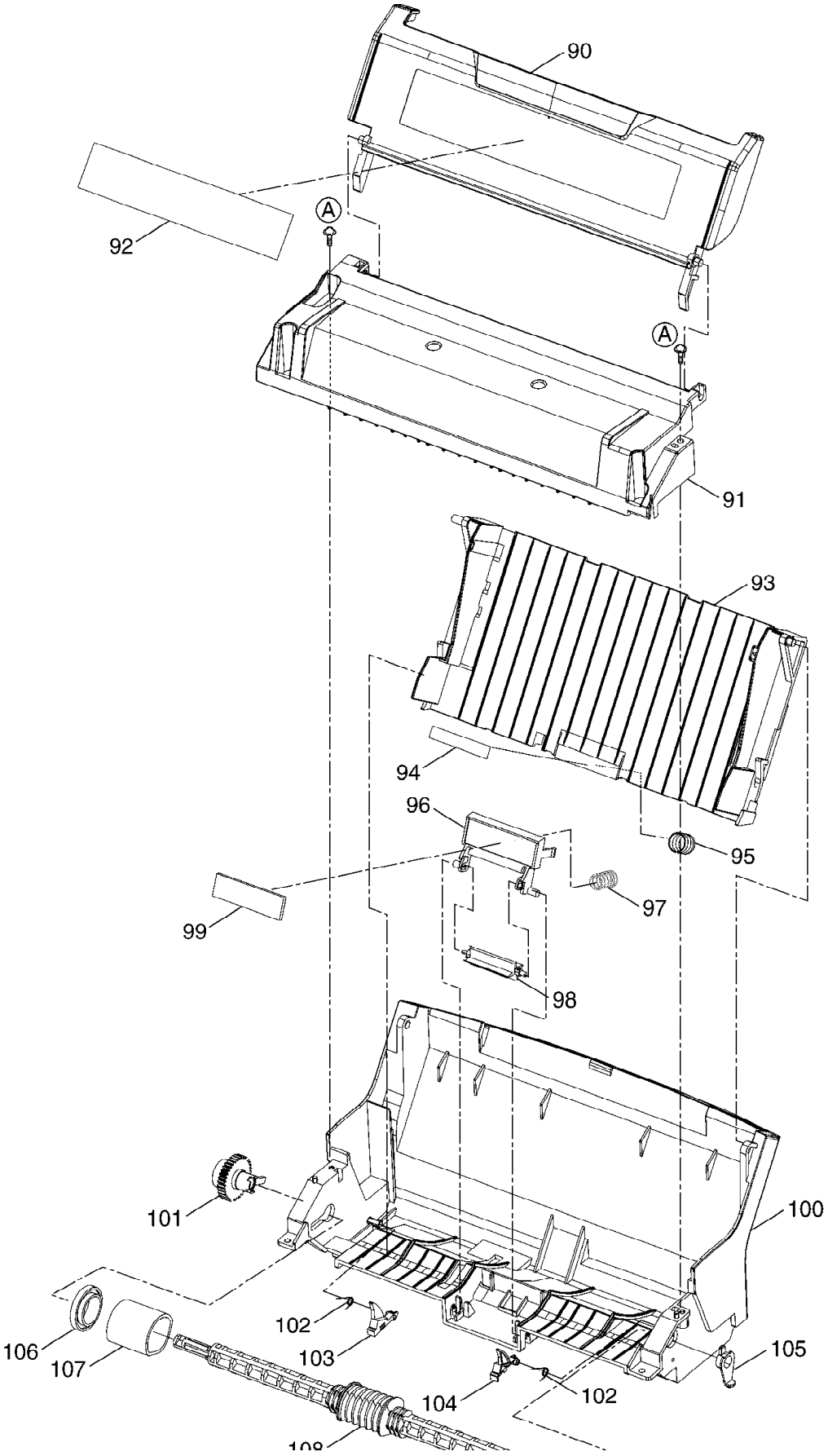

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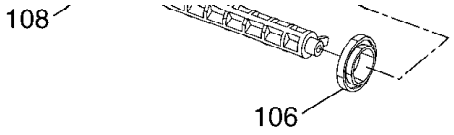


10.4. OPERATION COVER SECTION (3)

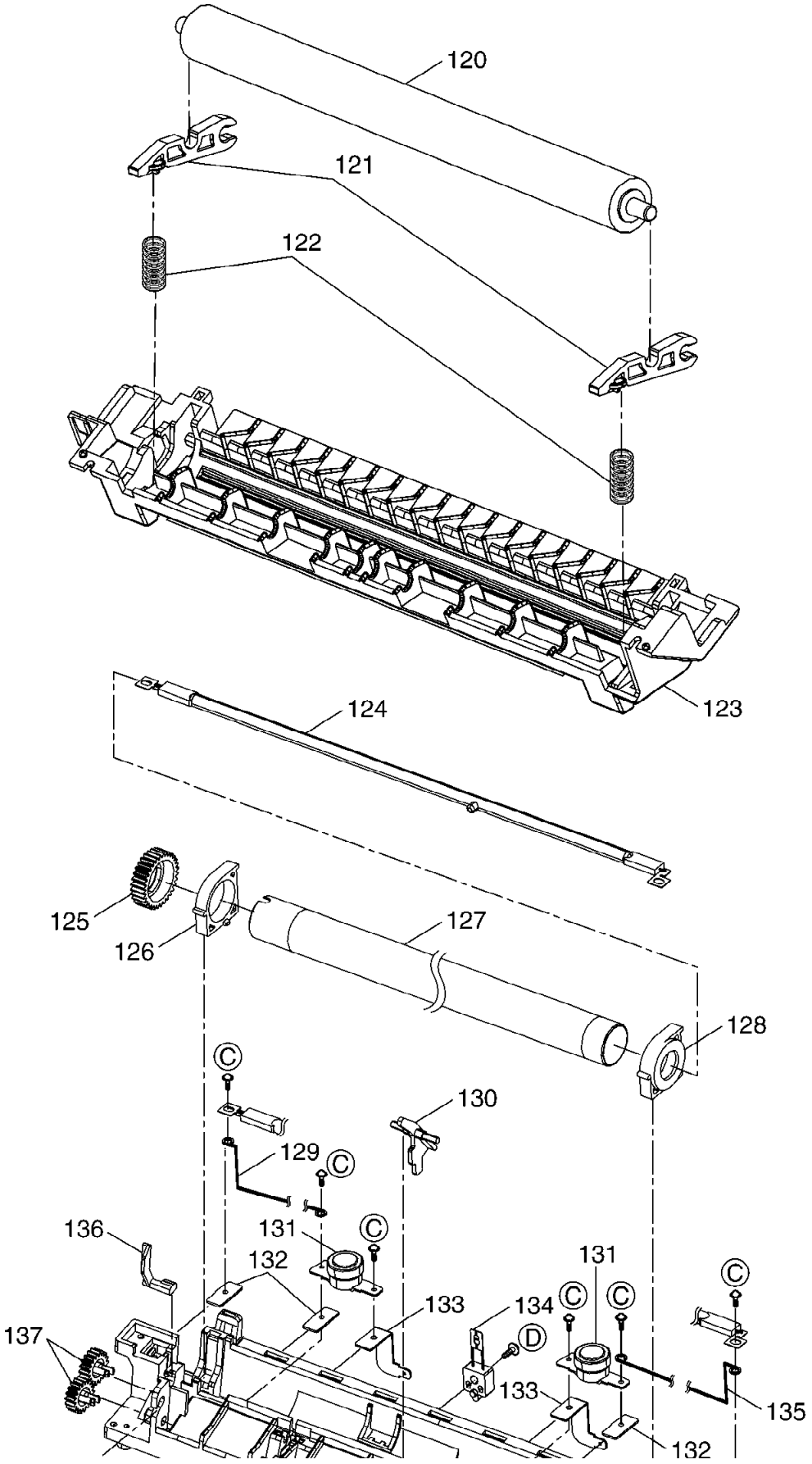


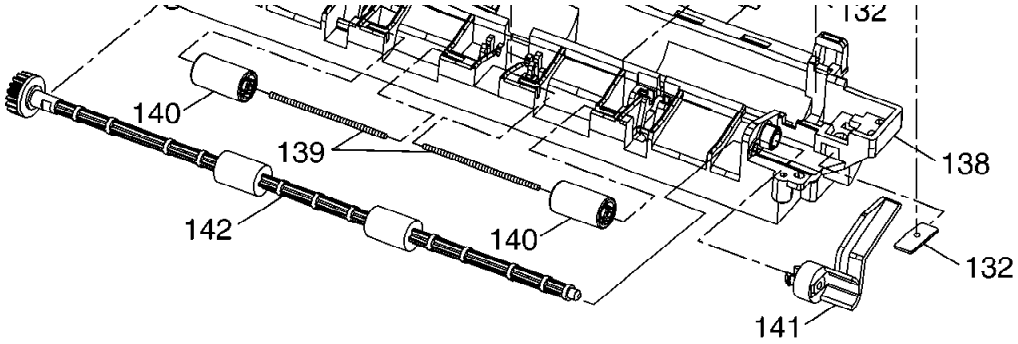
10.5. PICK UP SECTION


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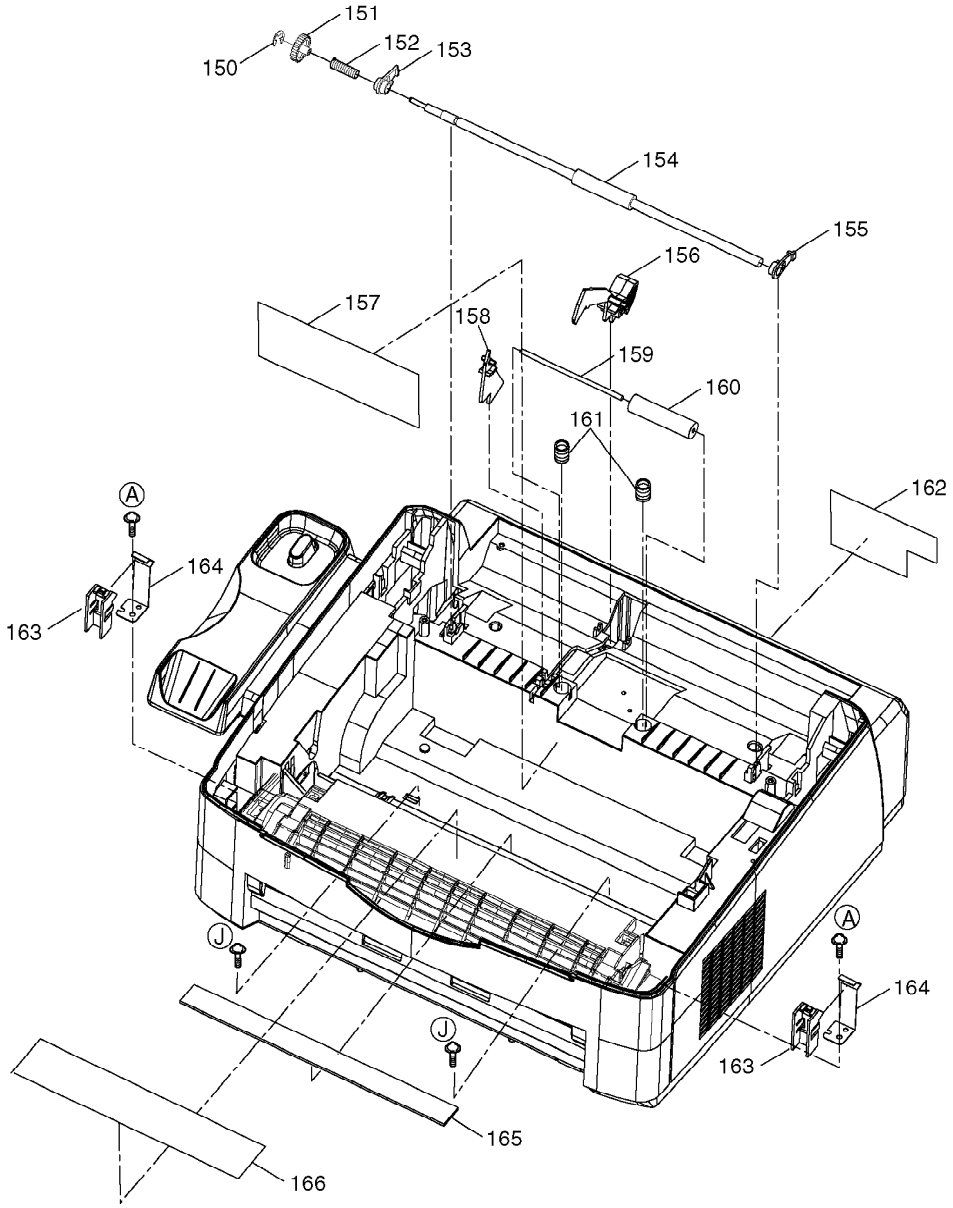


10.6. FUSER SECTION

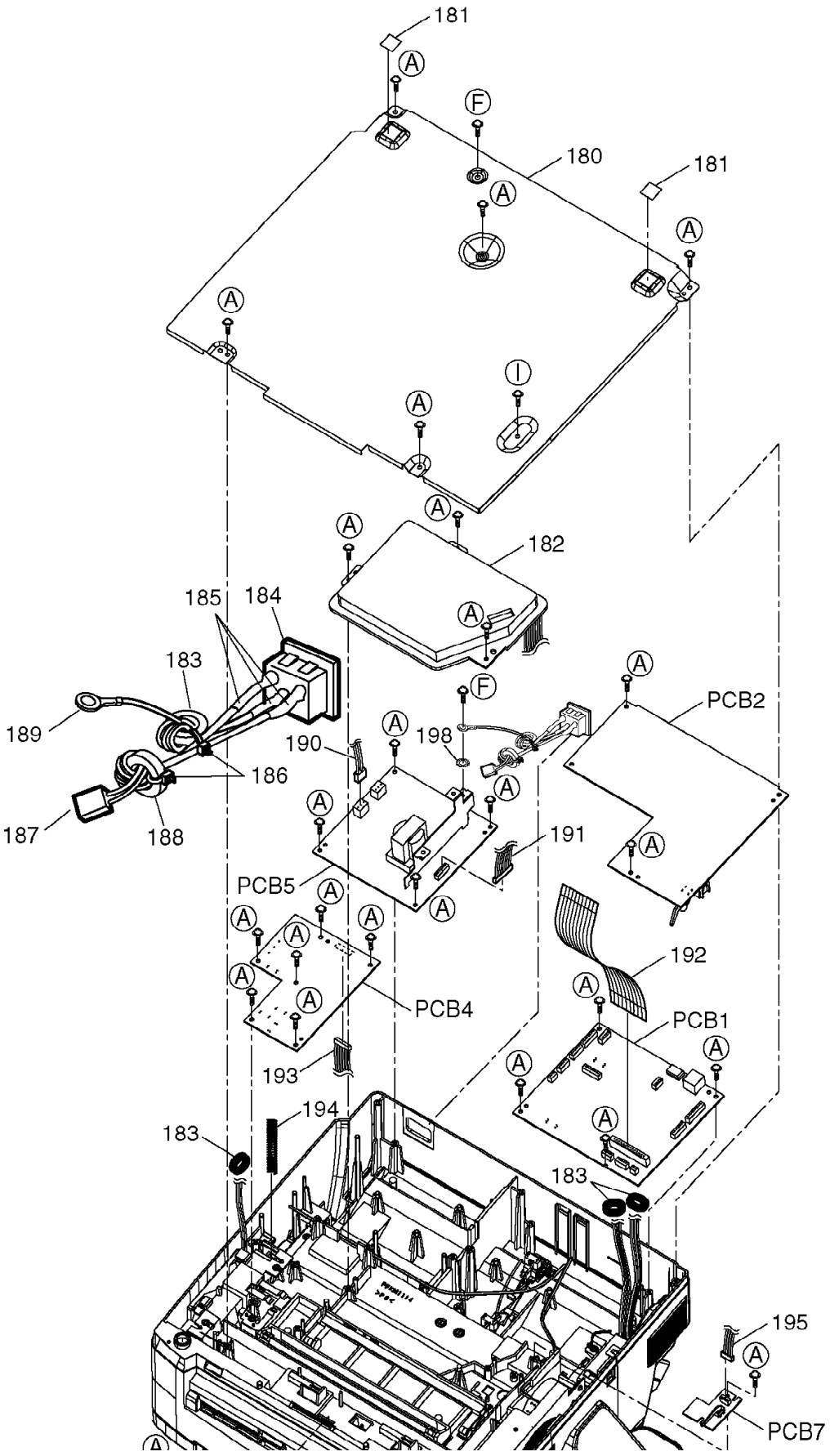

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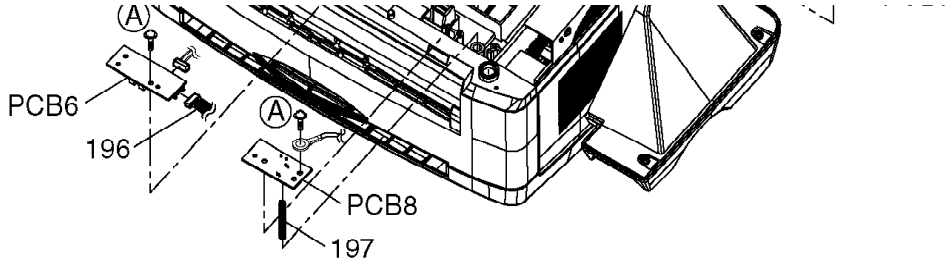


10.7. UPPER MAIN CABINET SECTION

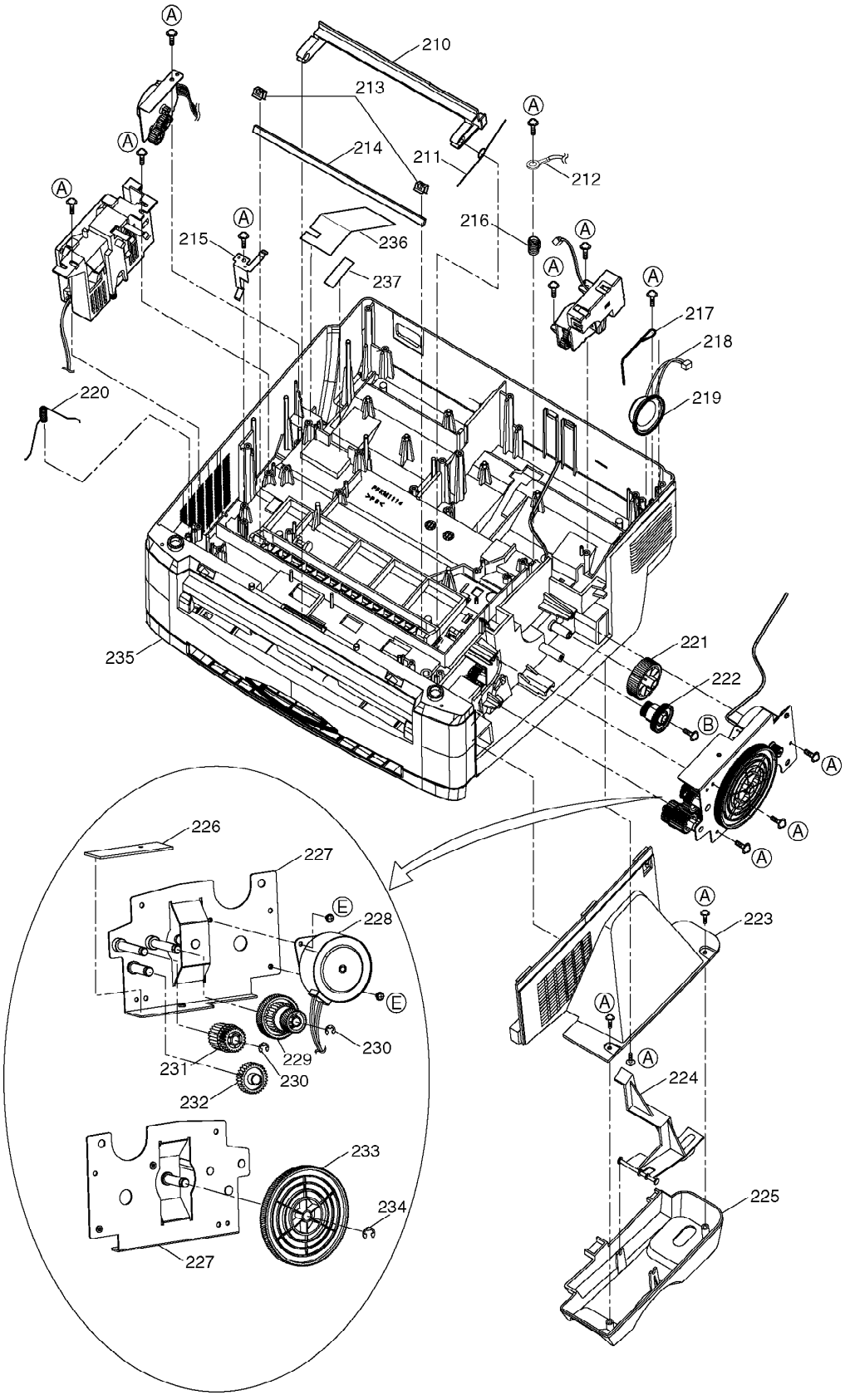


10.8. LOWER MAIN CABINET SECTION (1)

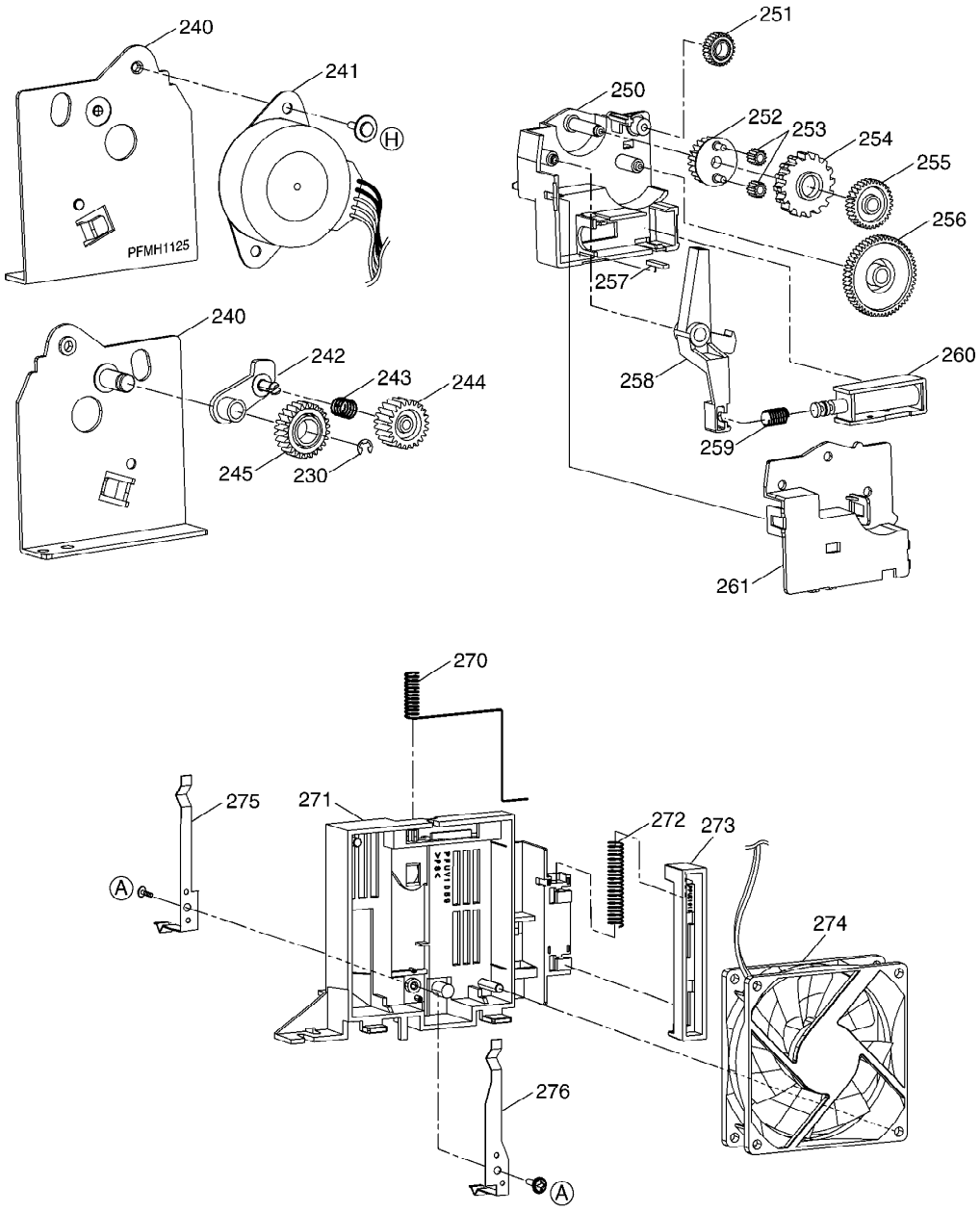

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PCB2
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PCB5
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PCB7



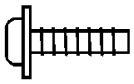
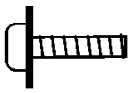
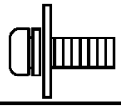
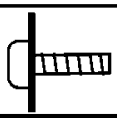
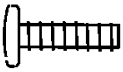
10.9. LOWER MAIN CABINET SECTION (2)



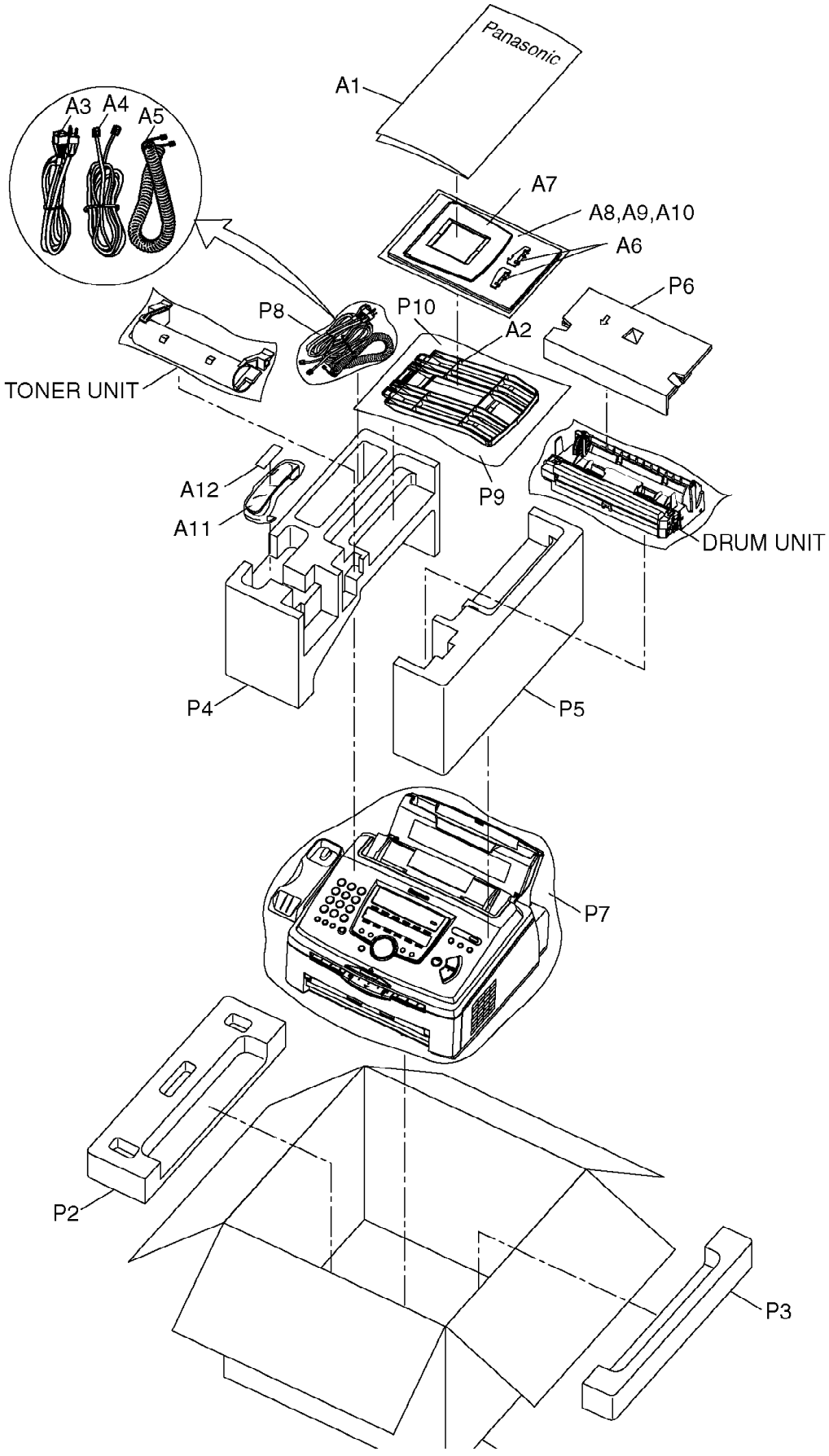
10.10. LOWER CABINET SECTION (3)



10.11. ACTUAL SIZE OF SCREWS AND WASHER

	Parts No.	Illustration
Ⓐ	XTW3+S10P	
Ⓑ	XTW3+W10P	
Ⓒ	XYC3+FF8C	
Ⓓ	XTW3+S12P	
Ⓔ	XTW3+5LFZ	
Ⓕ	XSB4+6	
Ⓖ	XTW4+W8P	
Ⓗ	XYN3+C6	
Ⓘ	XTW3+6L	
Ⓙ	XTB3+10G	
Ⓚ	XTW3+S20P	

11. ACCESSORIES AND PACKING MATERIALS


Panasonic
A1
A3
A4
A5
A7
A8,A9,A10
A6
P6
P8
P10
A2
TONER UNIT
A12
A11
P9
DRUM UNIT
P4
P5
P7
P2
P3



12. REPLACEMENT PARTS LIST

RTL (Retention Time Limited)

Notes:

1. **The marking (RTL) indicates that the Retention Time is limited for this item.**
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
   After the end of this period, the assembly will no longer be available.
2. **Important safety notice**
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. **The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.**
4. **ISO code (Example : ABS-HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.**
5. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω) k=1000 Ω , M=1000k Ω
   All capacitors are in MICRO FARADS (μ F) P= μ μ F
   ***Type & Wattage of Resistor**

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor

Wattege

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V

12.1. CABINET AND ELECTRICAL PARTS

12.1.1. OPERATION COVER SECTION (1)

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFKR1029Z1	GUIDE,DOCUMENT L	ABS-HB
2	PFKR1030Z1	GUIDE,DOCUMENT R	ABS-HB
3	PFKE1030X1	GUIDE,DOCUMENT	PS-HB
4	PFUS1222Z	COIL SPRING,SLIDER	
5	PFDG1015Y	GEAR,SLIDER	
6	PFQT2075Z	INDICATION LABEL	
7	PFME1001Z	SPACER ,DUMPER	
8	PFHG1094Z	RUBBER,DUMPER	
9	PFJS08P33Z	CONNECTOR,8P	
10	PFBX1192Z2	PUSH BUTTON,DERC	ABS-HB
11	PFBX1191Z2	PUSH BUTTON,NAVI	ABS-HB
12	PFBC1100Z1	PUSH BUTTON,AUTO ANSWER	ABS-HB
13	PFBC1098Z1	PUSH BUTTON,MENU	ABS-HB
14	PFBX1193Z1	PUSH BUTTON,STP	ABS-HB
15	PFBC1101Z1	PUSH BUTTON,COPY START	ABS-HB
16	PFBC1099Z1	PUSH BUTTON,START	ABS-HB
17	PFBX1190Z1	PUSH BUTTON,DIAL	ABS-HB
18	PFGP1250Z1	PANEL,LCD	
19	PFGV1015Z	COVER,TEL CARD	
20	PFGD1050Z	CARD,TEL NO	
21	PFGG1206Z1	GRILL,SUB	PS-HB
22	PFGB1003Z3	BADGE	
23	PFGX1009Z	PUSH BUTTON,NAVI	ABS-HB
24	PFGG1205Z1	GRILLE,OPERATION	PS-HB

12.1.2. OPERATION COVER SECTION (2)

Ref. No.	Part No.	Part Name & Description	Remarks
30	PFUS1444Z	SPRING,ERATH DOC.A	
31	PFDG1320Z	GEAR,DOC.FEED ROLLER	POM
32	PFDJ1006Z	SPACER,ROLLER	POM
33	PFDN1066Z	ROLLER	
34	PFUS1506Z	SPRING	
35	PFHG1104Y	RUBBER,SEPARATION	
36	PFUS1437Z	LEAF SPRING	
37	PFUS1443Z	SPRING,EARTH OP B	
38	PFHX1679Z	COVER,SHEET	
39	PFJV1003Z	COVER,DISCHARGE BRUSH	
40	PFUV1065Y	COVER,OPERATION PANEL	PS-HB
41	PFDE1209Z	LEVER,DOC,DETECTION	POM
42	PFUS1445Z	SPRING,EARTH DOCUMENT B	
43	PFUS1447Z	SPRING,EARTH DOC ROLLER	
44	PFUS1442Z	SPRING,EARTH OP A	
45	PFHX1695Z	SHEET, SEPARATION SPRING	
46	PFHX1696Z	SHEET, SEPARATION STOPPER	

12.1.3. OPERATION COVER SECTION (3)

Ref. No.	Part No.	Part Name & Description	Remarks
50	PFDS1010Z	ROLLER,SEPARATION	POM
51	PFDJ1063Y	SPACER,SEPARATION ROLLER	POM
52	PFDE1198Z	ARM	POM
53	PFDG1189Z	GEAR	
54	PFDG1295Z	GEAR	POM
55	PFUS1422Z	COIL SPRING ,LOCK ARM	
56	PFDE1199Z	ARM,LOCK	POM
57	PFDE1200Y	SPACER,LOCK ARM	POM
58	PFDG1296Z	GEAR,SEPARATION	POM
59	PFJS07P32Z	CONNECTOR,7P	
60	N2GZBE000006	CIS(CONTACT IMAGE SENSOR)	
61	PFUS1440Y	COIL SPRING,CIS	
62	PFDF1098Z	SHAFT,SUPPORT ROLLER	
63	PFDR1044Y	ROLLER ,DOC.SUPPORT	POM
64	PFUS1441Y	COIL SPRING,SUPPOR ROLLER	
65	PFUG1017Z	GUIDE,MIDDLE	PS-HB
66	PFDG1297Z	GEAR	POM
67	PFDG1298Z	GEAR	POM
68	PFDE1201X	ARM	
69	PFUS1019Z	TORSION SPRING	
70	PFDG1299Z	GEAR	POM
71	PFDJ1042Z	SPACER,TRANSFER ROLLER	
72	PFUS1269Y	COIL SPRING	
73	PFDS1009Z	ROLLER,TRANSFER	
74	PFDG1294Z	GEAR	POM
75	PFMH1124Z	METAL PARTS	
76	PFZX2FL511M	TRAY,DOCUMENT	
77	PFDJ1051X	SPACER	

12.1.4. PICK UP SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
90	PFKE1029Y1	TRAY,PICK UP ROLLER	PS-HB
91	PFKV1075Z1	COVER,TRAY	PS-HB
92	PFQT2097Z	LABEL	
93	PFKS1084Z1	TRAY ,LIFT PAPER	PS-HB
94	PFHG1154Z	RUBBER,LIFT PLATE	
95	PFUS1424Z	SPRING,PLATE LIFT	
96	PFHR1370Z	CASE,SEPARATION PAPER	ABS-HB
97	PFUS1425Z	SPRING,PAPER SEPARATION	
98	PFHR1371Z	SHEET,PAPER	POM
99	PFHG1155Z	RUBBER,SEPARATION PAPER	
100	PFKE1028X1	TRAY,BOTTOM	PS-HB
101	PFDG1300Z	GEAR,PICK UP PAPER	POM
102	PFUS1423Z	SPRING,LIFT LOCK	
103	PFHR1368Z	LEVER,LOCK LIFT L	POM
104	PFHR1369Z	LEVER,LOCK LIFT R	POM
105	PFDJ1038Z	SPACER,PICK UP PAPER	POM
106	PFDR1018Z	ROLLER,PICK UP GUIDE	POM
107	PFDN1048Z	ROLLER,PICK UP	
108	PFDR1041Z	ROLLE,PICK UP PAPER	ABS-HB

12.1.5. FUSER SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
120	PFDS1014Z	ROLLER,PRESSURE PFA	
121	PFDJ1066Y	SPACER,PRESSURE ROLLER	
122	PFUS1426Z	COIL SPRING	
123	PFUA1044Z	CHASSIS,FUSER	PBT+ABS
124	A4DP3L000002	HEATER	
125	PFDG1301Z	GEAR,HEAT ROLLER	
126	PFDJ1065Z	SPACER,HEAT ROLLER A	
127	PFDS1011Y	ROLLER,HEAT	
128	PFDJ1064Z	SPACER,HEAT ROLLER A	
129	PFJT1023Z	TERMINAL PLATE,WIRE B	
130	PFDE1207Z	LEVER,EXIT SENSOR	
131	PFTA1001Z	THERMOSTAT,FUSER	
132	PFMH1085Z	METAL PARTS,HEATER	
133	PFJT1021Z	TERMINAL PLATE,FUSER	
134	PFRT003	SENSOR	S
135	PFJT1022Z	TERMINAL PLATE,WIRE A	
136	PFHR1408Z	LEVER	
137	PFDG1302Z	GEAR,EJECT IDLER	POM
138	PFUA1043X	CHASSIS,FUSER	PBT+ABS
139	PFUS1435Z	SPRING,SUPPORT EJECT	
140	PFDR1043Z	ROLLER,SUPPORT EJECT	POM
141	PFHR1372Y	LEVER	ABS
142	PFDR1042Z	ROLLER,EJECT	POM

12.1.6. UPPER MAIN CABINET SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
150	XUC2FY	RETAINING RING	
151	PFDG1201Z	GEAR,FEED ROLLER	POM
152	PFUS1325Z	SPRING	
153	PFDJ1067Z	SPACER,FEED ROLLER	POM
154	PFDN1065Z	ROLLER,FEED	
155	PFDJ1044Z	SPACER	POM
156	PFDE1203Z	LEVER	ABS
157	PFQT2076Z	INDICATION PLATE-LABEL	
158	PFDE1204W	LEVER	POM
159	PFDF1097Z	SHAFT	
160	PQDR9685Y	ROLLER	POM
161	PFUS1275Z	COIL SPRING	
162	PFGT2289Z-M	NAME PLATE, AL	
163	PFUE1022Z	CASE,COVER	
164	PFUS1448Z	LEAF SPRING	
165	PF0G1006Z	MIRROR	
166	PFQT2077Z	LABEL	

12.1.7. LOWER MAIN CABINET SECTION (1)

Ref. No.	Part No.	Part Name & Description	Remarks
180	PFMD1065Z	COVER	
181	PFHG1169Z	RUBBER PARTS,FOOT	
182	LPA1603K	LASER UNIT	⚠
183	PQLB1E1	INSULATOR	
184	PFJP03S04Z	AC SOCKET	⚠S
185	PQMX10010Z	CASE,COVER	
186	PQHR945Z	BAND	
187	PFJS02P02Z	CONNECTOR	
188	KR06TT251508	INSULATOR	
189	WLR18YK26CM4	LEAD WIRE	
190	PFJS02P34Z	CONNECTOR	
191	PFJS08P31Z	CONNECTOR	
192	PFJE1021Z	LEAD WIRE	
193	PFJS06P30Z	CONNECTOR,6P	
194	PFUS1431Z	COIL SPRING	
195	PFJS04P28Z	CONNECTOR	
196	PFJS05P29Z	CONNECTOR,5P	
197	PFUS1449Z	COIL SPRING	
198	XWC4B	WASHER	

12.1.8. LOWER MAIN CABINET SECTION (2)

Ref. No.	Part No.	Part Name & Description	Remarks
210	PFUE1015Z	PLASTIC PARTS	ABS
211	PFUS1450Z	TORSION SPRING	
212	WLL20YG24M3M	LEAD WIRE	
213	PFUS1028Z	LEAF SPRING	
214	PF0M1005Z	MIRROR	
215	PFUS1429Z	LEAF SPRING	
216	PFUS1439Z	COIL SPRING	
217	PFUS1502Z	TORSION SPRING	
218	PFJS02P12Z	CONNECTOR	
219	PFAS50P006Z	SPEAKER	
220	PFUS1456Z	TORSION SPRING	
221	PFDG1310Z	GEAR,IDLER	POM
222	PFDG1311Z	GEAR,IDLER	POM
223	PFKF1058Z1	CABINET COVER,HANDSET	PS
224	PFBH1024Z1	PUSH BUTTON,HOOK	ABS-HB
225	PFKM1115Z1	CABINET BODY,HANDSET	PS
226	PFHX1657Z	SPACER	
227	PFUA1045Z	CHASSIS,GERA MAIN	
228	55SPM25D3NA	DC MOTOR	
229	PFDG1304Z	GEAR,IDLER 67	POM
230	XUC4FY	E-RING	
231	PFDG1306Z	GEAR,FISER IDLER 2	POM
232	PFDG1305Z	GEAR,FUSER IDLER	POM
233	PFDG1303Z	GEAR,IDLER	POM
234	XUC5FY	RETAINING RING	
235	PFKM1114Z1	CABINET BODY,MAIN	PS
236	PFHX1674Z	COVER,PROTECTION SHEET	
237	PFHX1668Z	COVER,CABINET SHEET	

12.1.9. LOWER CABINET SECTION (3)

Ref. No.	Part No.	Part Name & Description	Remarks
240	PFMH1125Z	PLATE,MOTOR	
241	PFJQ35S1S15D	DC MOTOR	S
242	PFDE1201X	ARM	POM
243	PFUS1019Z	SPRING	
244	PFDG1299Z	GEAR,PLANET	POM
245	PFDG1297Z	GEAR,IDLER	POM
250	PFUA1046Z	CHASSIS	PBT+ABS
251	PFDG1297Z	GEAR,IDLER	
252	PFDG1307Z	GEAR,PICK CLUTCH B	POM
253	PFDG1189Z	GEAR	
254	PFDG1308Z	GEAR	POM
255	PFDG1309Z	GEAR,PICK CLUTCH A	POM
256	PFDG1176Z	GEAR,IDLER B	
257	PFHG1165Z	RUBBER,SOLENOID	
258	PFDE1202Z	LEVER,PICK UP CLUTCH	POM
259	PFUS1259Y	SPRING,SOLENOID	
260	PFFP1003Z	PLUNGER,SOLENOID	
261	PFUA1047Z	CHASSIS,GERA CHASSIS	ABS
270	PFUS1430Z	SPRING,TERMINAL TRS	
271	PFUV1059Y	CASE,FAN	PS
272	PFUS1451Z	SPRING,COVER OPEN	

Ref. No.	Part No.	Part Name & Description	Remarks
273	PFUE1016Z	LEVER	ABS
274	L6FALDGK0001	MOTOR,FAN	
275	PFUS1428Z	LEAF SPRING,TERMINAL DEV	
276	PFUS1427Z	LEAF SPRING	

12.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFQW2088Z	LEAFLET	
A2	PFKS1096Z1	TRAY,PAPER STACKER	
A3	PQJA10075Z	CORD,POWER	⚠
A4	PFJA1029Z	CORD,TEL	
A5	PFJA1030Z	CORD,CURL	
A6	PFZXFL511M	GUIDE,A4 PAPER GUIDE	
A7	PFKS1085Z1	TRAY,PAPER TRAY	PS-HB
A8	PFQX1939Z	INSTRUCTION BOOK	
A9	PFQX1940Z	INSTRUCTION BOOK,OPEN LCR	
A10	PFQW2089Z	Q.R.G SPANISH	
A11	PFJXE0805Z	HANDSET	⚠
A12	PFQS1133Z	LABEL	
P1	PFZE1150Z-M	GIFT BOX	
P2	PFPN1307Z	CUSHION	
P3	PFPN1308Y	CUSHION	
P4	PFPN1305Y	CUSHION	
P5	PFPN1306Y	CUSHION	
P6	PFPD1165Y	CUSHION	
P7	PFPH1040Y	PROTECTION COVER	
P8	XZB20X35A04	PROTECTION COVER	
P9	XZB32X45A04	PROTECTION COVER	
P10	PFPH1046Z	PROTECTION COVER	

12.3. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FL541M	DIGITAL BOARD ASS'Y (RTL)	
		(ICs)	
IC600	C5CB00000053	IC	
IC604	C3ABQG000069	IC	
IC605	C1CB00001566	IC	
IC606	C1CB00001551	IC	
IC607	PFWIFL541M	IC(ROM)	
IC608	C0DBFGD00012	IC	
IC609	C0GBH0000015	IC	
IC610	PFVIT2003APS	IC	S
IC611	C0JBAR000386	IC	
		(TRANSISTORS)	
Q602	PQVTDTC143E	TRANSISTOR(SI)	S
Q603	2SB1197K	TRANSISTOR(SI)	S
Q604	PQVTDTC143E	TRANSISTOR(SI)	S
Q605	2SB1197K	TRANSISTOR(SI)	S
Q606	PQVTDTC143E	TRANSISTOR(SI)	S
Q607	2SB1197K	TRANSISTOR(SI)	S
Q609	2SD1819A	TRANSISTOR(SI)	S
Q612	PQVTD143Z106	TRANSISTOR(SI)	S
Q613	PQVTD143Z106	TRANSISTOR(SI)	S
Q614	2SD1819A	TRANSISTOR(SI)	S
Q615	PQVTDTC143E	TRANSISTOR(SI)	S
Q616	PQVTDTC143E	TRANSISTOR(SI)	S
Q617	PQVTD143Z106	TRANSISTOR(SI)	S
Q618	2SD1819A	TRANSISTOR(SI)	S
Q619	2SB1197K	TRANSISTOR(SI)	S
Q620	2SB1322	TRANSISTOR(SI)	S
Q621	PQVTD143Z106	TRANSISTOR(SI)	S
Q622	PQVTD143Z106	TRANSISTOR(SI)	S
Q623	PQVTDTC143E	TRANSISTOR(SI)	S
Q624	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIODES)	
D600	PQVDRLS73T	DIODE(SI)	S
D601	PQVDNNCD56DT	DIODE(SI)	S
D602	PFVDRMRLS245	DIODE(SI)	S
D606	B0JAME000005	DIODE(SI)	
D607	MA7160	DIODE(SI)	
D608	PFVDRMRLS245	DIODE(SI)	S
		(BATTERYS)	
BAT600	CR-2032/V9A	LITIUM BATTERY	
		(CONNECTORS)	
CN600	PQJS28X59Z	CONNECTOR,28P	
CN601	PQJP4G30Z	CONNECTOR,4P	S
CN602	PQJP3G30Z	CONNECTOR,3P	S
CN603	PQJP02G100Z	CONNECTOR,2P	
CN604	PQJP5G30Z	CONNECTOR,5P	S
CN606	PQJP8G30Z	CONNECTOR,8P	S
CN607	PQJS08X53Z	CONNECTOR,8P	
CN608	PQJP7G30Z	CONNECTOR,7P	S
CN609	PQJP4G30Z	CONNECTOR,4P	S
CN610	PQJP5G30Z	CONNECTOR,5P	S
CN611	PQJP05G100Z	CONNECTOR,5P	
CN612	PQJP08G100Z	CONNECTOR,8P	

Ref. No.	Part No.	Part Name & Description	Remarks
CN613	PQJP8G30Z	CONNECTOR,8P	S
CN614	PQJP6G30Z	CONNECTOR,6P	S
		(FUSES)	
F600	PFRB0031063	FUSE	
F602	PFRB0031063	FUSE	
F603	PFRB0031031T	FUSE	S
F604	PFRB0032315T	FUSE	S
F605	PFRB002122KZ	FUSE	S
F606	PFRB0031200	FUSE	S
		(CRYSTAL OSCILLATORS)	
X602	PFVCCSA24Z	CRYSTAL OSCILLATOR	S
X603	H0A327200079	CRYSTAL OSCILLATOR	
X801	H0J282500005	CRYSTAL OSCILLATOR	
		(COILS)	
L601	PFVF1B102SP	COIL	
L602	PFVF1B102SP	COIL	
L603	PFVF1B102SP	COIL	
L604	PFVF1B102SP	COIL	
L605	PFVF1B102SP	COIL	
L606	PFVF1B102SP	COIL	
L607	PQLQR2BT	COIL	S
L608	PFVF1B601ST	COIL	S
L609	PFVF1B102SP	COIL	
L615	PQLQR2BT	COIL	S
L616	PQLQR1ET	COIL	S
L618	PFVF1B252SDT	COIL	S
L619	PFVF1B252SDT	COIL	S
L620	PFVF1B252SDT	COIL	S
L621	PFVF1B252SDT	COIL	S
L627	PFVF1B252SDT	COIL	S
L628	PFVF1B252SDT	COIL	S
L630	PFVF2P221SG	COIL	S
L631	PQLQR2BT	COIL	S
L633	PFVF1A102ST	COIL	
L634	PQLQR2KA20T	COIL	S
L635	PQLQR2KA20T	COIL	S
L636	PQLQR2KA20T	COIL	S
L637	PFVF1A102ST	COIL	
L638	PFVF1A102ST	COIL	
L639	PFVF1A102ST	COIL	
L641	PFVF1B601ST	COIL	S
L642	PFVF1B252SDT	COIL	S
L643	PFVF1B252SDT	COIL	S
L644	PFVF1B252SDT	COIL	S
L645	PFVF1B601ST	COIL	S
L646	PFVF1B601ST	COIL	S
L647	PFVF1B252SDT	COIL	S
L648	PQLQR2BT	COIL	S
L649	PFVF2P221SG	COIL	S
L650	PFVF2P221SG	COIL	S
L654	PFVF1B102SP	COIL	
L656	PFVF1B102SP	COIL	
L658	PFVF1B102SP	COIL	
L659	PFVF1B102SP	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
		(PHOTO ELECTRIC TRANSDUCERS)	
PS600	PFVIRM574SL	PHOTO SENSOR	S
PS601	PFVIRM574SL	PHOTO SENSOR	S
		(COMPONENTS PARTS)	
L632	EXCELDR35	COMPONENTS PARTS	
RA600	PFXBV8V101JV	RESISTOR ARRAY	S
RA601	PFXBV8V101JV	RESISTOR ARRAY	S
RA602	PFXBV8V101JV	RESISTOR ARRAY	S
RA603	D0GZ220J0001	RESISTOR ARRAY	
RA604	D0GZ220J0001	RESISTOR ARRAY	
RA605	D0GZ220J0001	RESISTOR ARRAY	
RA606	D0GZ220J0001	RESISTOR ARRAY	
RA607	D0GZ220J0001	RESISTOR ARRAY	
RA608	D0GZ220J0001	RESISTOR ARRAY	
RA609	D0GZ220J0001	RESISTOR ARRAY	
RA610	D0GZ220J0001	RESISTOR ARRAY	
RA611	D0GZ220J0001	RESISTOR ARRAY	
RA612	D0GZ220J0001	RESISTOR ARRAY	
RA613	EXRV8V470JV	RESISTOR ARRAY	S
RA614	EXRV8V470JV	RESISTOR ARRAY	S
RA615	EXRV8V470JV	RESISTOR ARRAY	S
RA616	EXRV8V470JV	RESISTOR ARRAY	S
RA617	EXRV8V470JV	RESISTOR ARRAY	S
RA618	EXRV8V470JV	RESISTOR ARRAY	S
RA619	EXRV8V470JV	RESISTOR ARRAY	S
RA620	EXRV8V470JV	RESISTOR ARRAY	S
RA621	EXRV8V470JV	RESISTOR ARRAY	S
		(RESISTORS)	
L617	PQ4R10XJ000	0	S
L622	PQ4R10XJ000	0	S
L623	ERJ3GEYJ271	270	
L624	ERJ3GEYJ271	270	
L625	ERJ3GEYJ271	270	
L626	ERJ3GEYJ271	270	
L640	PQ4R10XJ000	0	S
L651	PQ4R10XJ000	0	S
L652	PQ4R10XJ000	0	S
L653	ERJ3GEYJ472	4.7k	
L655	ERJ3GEYJ472	4.7k	
L657	ERJ3GEYJ472	4.7k	
L660	ERJ3GEYJ472	4.7k	
L661	ERJ3GEYJ472	4.7k	
R601	ERG2SJ271	270	
R602	ERJ3GEYJ103	10k	
R603	ERJ3GEYJ563	56k	
R607	ERJ3GEYJ562	5.6k	
R608	ERJ3GEYJ562	5.6k	
R609	ERJ3GEYJ562	5.6k	
R610	ERJ3GEYJ562	5.6k	
R611	PQ4R10XJ331	330	S
R612	ERJ3GEYJ103	10k	
R613	ERJ3GEYJ563	56k	
R614	ERJ3GEYJ472	4.7k	
R615	ERJ3GEYJ563	56k	

Ref. No.	Part No.	Part Name & Description	Remarks
R616	ERJ3GEYJ562	5.6k	
R617	PQ4R10XJ331	330	S
R618	D0GG472JA002	4.7k	
R619	ERJ3GEYJ101	100	
R620	ERJ3GEYJ563	56k	
R621	ERJ12YJ390	39	
R622	D0GG472JA002	4.7k	
R623	ERJ3GEYJ103	10k	
R624	ERJ3GEYJ103	10k	
R625	D0GG472JA002	4.7k	
R626	ERJ3GEYJ103	10k	
R629	ERJ3GEYJ101	100	
R630	PQ4R10XJ331	330	S
R631	ERJ3GEYJ563	56k	
R632	ERJ3GEYJ562	5.6k	
R633	ERJ3GEYF393	39k	S
R634	ERJ3GEYF393	39k	S
R635	ERJ3EKF2202	22k	
R636	ERJ3EKF2202	22k	
R637	ERJ3EKF1802	18k	
R638	ERJ3EKF3302	33k	
R640	ERJ3GEYJ101	100	
R641	ERJ3GEYJ101	100	
R642	ERJ3GEYJ101	100	
R643	ERJ3GEYJ181	180	
R644	ERJ3GEYJ102	1k	
R645	ERJ3GEYJ103	10k	
R647	ERJ3GEYJ473	47k	
R649	ERJ3GEYJ473	47k	
R650	ERJ3GEYJ473	47k	
R652	ERJ3GEYJ101	100	
R653	ERJ3GEYJ101	100	
R660	ERJ3GEYJ103	10k	
R668	ERJ3GEY0R00	0	
R675	ERJ3GEYJ473	47k	
R678	ERJ3GEYJ470	47	
R679	ERJ3GEYJ105	1M	
R680	ERJ3GEY0R00	0	
R681	ERJ3GEY0R00	0	
R682	ERJ3GEY0R00	0	
R683	ERJ3GEYJ220	22	
R686	ERJ3GEYJ470	47	
R688	ERJ3GEYJ473	47k	
R690	ERJ3GEYJ101	100	
R691	ERJ3GEYJ101	100	
R695	ERJ3GEYJ220	22	
R696	ERJ3GEYJ220	22	
R697	ERJ3GEYJ220	22	
R698	ERJ3GEYJ220	22	
R701	ERJ3GEYJ473	47k	
R703	ERJ3GEYJ470	47	
R704	ERJ3GEYJ475	4.7M	
R705	ERJ3GEYJ4R7	4.7	
R707	ERJ3GEYJ334	330k	

Ref. No.	Part No.	Part Name & Description	Remarks
R708	ERJ3GEYJ222	2.2k	
R709	ERJ3GEYJ472	4.7k	
R710	ERJ3GEYJ4R7	4.7	
R712	ERJ3GEYJ470	47	
R715	ERJ3GEYJ473	47k	
R716	ERJ3GEY0R00	0	
R719	ERJ3GEYJ183	18k	
R721	ERJ3GEY0R00	0	
R722	ERJ3EKF1101	0	
R723	ERJ3EKF3602	36k	
R724	ERJ8GEYJ1R0	1	
R726	ERJ3GEYJ103	10k	
R727	ERJ3GEYJ101	100	
R728	ERJ3GEYJ101	100	
R729	PQ4R18XJ100	10	S
R730	ERJ3GEYJ472	4.7k	
R731	ERJ3GEYJ222	2.2k	
R732	ERJ3GEYJ333	33k	
R733	D0C1R47GA003	0.47	
R734	D0C1R47GA003	0.47	
R735	ERJ3GEYJ222	2.2k	
R736	ERJ3GEYJ102	1k	
R737	ERDS1VJ152	1.5k	S
R738	ERJ3GEYJ473	47k	
R739	ERJ3GEYJ101	100	
R740	ERJ3GEYJ473	47k	
R741	ERJ3GEYJ101	100	
R742	ERJ3GEYJ101	100	
R743	ERJ3GEYJ101	100	
R744	ERJ3GEYJ101	100	
R745	ERJ3GEYJ393	39k	
R746	ERJ3GEYJ103	10k	
R747	ERX1SJ2R2	2.2	
R748	ERJ3GEYJ472	4.7k	
R749	ERJ3GEYJ102	1k	
R750	ERJ3GEYJ102	1k	
R751	ERJ3GEYJ303	30k	
R752	ERJ3GEYJ683	68k	
R753	ERJ3GEYJ104	100k	
R754	ERJ3GEYJ473	47k	
R755	ERJ3GEYJ103	10k	
R756	ERJ3GEYJ562	5.6k	
R757	ERJ3GEYJ222	2.2k	
R758	ERJ3GEYJ183	18k	
R764	ERJ3GEYJ220	22	
R766	ERJ3GEY0R00	0	
R767	ERJ3GEYJ181	180	
R768	ERJ3GEYJ181	180	
R769	ERJ3GEYJ181	180	
R801	PQ4R10XJ000	0	S
R802	ERJ3GEYJ271	270	
R803	ERJ3GEYJ103	10k	
R804	ERJ3GEYJ103	10k	
R805	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R807	ERJ3GEYJ101	100	
R808	ERJ3GEYJ101	100	
R809	ERJ3GEY0R00	0	
R810	PQ4R10XJ220	22	S
R812	PQ4R10XJ220	22	S
R820	ERJ3GEYJ101	100	
R821	ERJ3GEYJ101	100	
R822	ERJ3GEYJ101	100	
R823	ERJ3GEYJ472	4.7k	
R824	ERJ3GEYJ472	4.7k	
R827	ERJ3GEY0R00	0	
R828	ERJ3GEY0R00	0	
R829	ERJ3GEYJ473	47k	
		(CAPACITORS)	
C600	ECUV1C104ZFV	0.1	
C601	ECEA1VKA101	100	S
C602	ECUV1C104ZFV	0.1	
C604	ECUV1H102KBV	0.001	
C605	ECUV1H102KBV	0.001	
C606	ECUV1H102KBV	0.001	
C607	ECUV1H102KBV	0.001	
C608	ECUV1H102KBV	0.001	
C609	ECUV1H102KBV	0.001	
C610	ECUV1H102KBV	0.001	
C623	ECUV1H102KBV	0.001	
C624	ECUV1H102KBV	0.001	
C625	ECUV1H102KBV	0.001	
C626	ECUV1H102KBV	0.001	
C627	ECUV1H102KBV	0.001	
C628	ECUV1C104ZFV	0.1	
C634	ECUV1H330JCV	33p	
C648	ECEA1VKA101	100	S
C652	ECUV1H222KBV	0.0022	
C654	ECUV1H222KBV	0.0022	
C655	ECUV1H120JCV	12p	
C656	ECUV1H150JCV	15p	
C659	ECUV1H150JCV	15p	
C661	ECUV1C104ZFV	0.1	
C662	ECUV1C104ZFV	0.1	
C663	ECUV1C104ZFV	0.1	
C664	ECUV1C104ZFV	0.1	
C665	ECUV1H270JCV	27p	
C666	ECUV1C104ZFV	0.1	
C667	ECUV1C104ZFV	0.1	
C668	ECUV1C104ZFV	0.1	
C669	ECUV1C104ZFV	0.1	
C670	ECUV1C104ZFV	0.1	
C671	ECUV1C104ZFV	0.1	
C672	ECUV1C104ZFV	0.1	
C673	ECUV1C104ZFV	0.1	
C674	ECUV1H150JCV	15p	
C675	ECUV1H150JCV	15p	
C676	ECUV1H150JCV	15p	
C677	ECUV1H270JCV	27p	

Ref. No.	Part No.	Part Name & Description	Remarks
C678	ECUV1C104ZFV	0.1	
C679	ECUV1C104ZFV	0.1	
C680	ECUV1H270JCV	27p	
C681	ECUV1C104ZFV	0.1	
C682	ECUV1C104ZFV	0.1	
C683	ECUV1C104ZFV	0.1	
C684	ECUV1C104ZFV	0.1	
C685	ECUV1H120JCV	12p	
C686	ECUV1H150JCV	15p	
C687	ECUV1C104ZFV	0.1	
C689	ECUV1C104ZFV	0.1	
C690	ECUV1C104ZFV	0.1	
C691	ECUV1H270JCV	27p	
C692	ECUV1C104ZFV	0.1	
C693	ECUV1C104ZFV	0.1	
C694	ECUV1C104ZFV	0.1	
C695	ECUV1C104ZFV	0.1	
C696	ECUV1C104ZFV	0.1	
C698	ECUV1C104KBV	0.1	
C699	ECUV1C104KBV	0.1	
C700	ECUV1C104KBV	0.1	
C701	ECUV1C104ZFV	0.1	
C702	ECUV1C104ZFV	0.1	
C703	ECUV1C104ZFV	0.1	
C704	ECUV1C104ZFV	0.1	
C705	ECUV1C104KBV	0.1	
C706	ECUV1C104KBV	0.1	
C708	ECUV1C104ZFV	0.1	
C710	ECUV1C104ZFV	0.1	
C711	ECUV1H332KBV	0.0033	
C712	ECUV1C104ZFV	0.1	
C713	ECUV1C104ZFV	0.1	
C716	ECUV1H102KBV	0.001	
C717	ECUV1C104ZFV	0.1	
C718	ECUV1H102KBV	0.001	
C719	ECUV1C104ZFV	0.1	
C720	ECEA1AU221	220	S
C721	ECUV1C104ZFV	0.1	
C723	ECEA1AU221	220	S
C724	PFCA1HYK331M	330p	S
C725	ECUV1H104ZFV	0.1	S
C726	ECUV1H104ZFV	0.1	S
C727	ECEA1VKA101	100	S
C729	ECUV1C104ZFV	0.1	
C730	ECUV1H104ZFV	0.1	S
C731	ECUV1C104ZFV	0.1	
C732	ECUV1H104ZFV	0.1	S
C733	ECEA1VKA101	100	S
C734	ECEA1AU101	100	S
C735	ECUV1C104ZFV	0.1	
C736	ECUV1C104ZFV	0.1	
C737	ECUV1C104ZFV	0.1	
C738	ECUV1H680JCV	68p	
C740	ECUV1H181JCV	180p	S

Ref. No.	Part No.	Part Name & Description	Remarks
C741	ECUV1H181JCV	180p	S
C745	ECUV1H181JCV	180p	S
C746	ECUV1H181JCV	180p	S
C747	ECUV1H181JCV	180p	S
C748	ECUV1H181JCV	180p	S
C749	ECUV1H104ZFV	0.1	S
C750	ECUV1C104ZFV	0.1	
C801	ECUV1H180JCV	18p	
C802	ECUV1H180JCV	18p	
C803	ECUV1A475KB	4.7	
C804	ECUV1C104ZFV	0.1	
C805	ECUV1H102KBV	0.001	
C806	ECUV1C104ZFV	0.1	
C807	ECUV1C104ZFV	0.1	
C808	ECUV0J106KB	10	
C811	ECUV1C104ZFV	0.1	
C812	ECUV1C104ZFV	0.1	
C813	ECUV1H100DCV	10p	S
C814	ECUV1H100DCV	10p	S
C815	ECUV1A475KB	4.7	
C817	ECUV1A475KB	4.7	
C818	ECUV1C104ZFV	0.1	
C819	ECUV1C104ZFV	0.1	
C822	ECEA0JKA331	330	
C823	ECUV0J106KB	10	
C824	ECUV1C104ZFV	0.1	
C825	ECUV1C104ZFV	0.1	
C836	ECEA0JKA221	220	
C837	ECEA0JKA221	220	
C839	ECUV1H100DCV	10p	S
C840	ECUV1C104KBV	0.1	
C841	ECUV1C104KBV	0.1	

12.4. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1529MZ-A	ANALOG BORD ASS'Y (RTL)	
		(ICs)	
IC204	PQVINJM4558M	IC	S
IC205	PQVINJM2904F	IC	S
IC206	PQVIMC34119D	IC	S
IC207	AN6383SB	IC	
		(TRANSISTOR)	
Q212	PQVTDTC143E	TRANSISTOR(SI)	
		(DIODES)	
D200	MA4056	DIODE(SI)	
D201	MA4056	DIODE(SI)	
D208	1SS133	DIODE(SI)	S
D209	1SS133	DIODE(SI)	S
D211	MA4056	DIODE(SI)	
D212	MA4056	DIODE(SI)	
D213	1SS133	DIODE(SI)	S
D217	1SS133	DIODE(SI)	S
D218	1SS133	DIODE(SI)	S
		(CONNECTORS & JACKS)	
CN200	PQJP02G100Z	CONNECTOR,2P	
CN201	PQJS28X59Z	CONNECTOR,28P	
CN202	PQJJ1TB18Z	JACK	S
CN203	PFJJ1T006Z	JACK	S
CN204	PFJJ1T006Z	JACK	S
		(COILS)	
L206	PFVF1B252SDT	COIL	S
L208	PFVF1B252SDT	COIL	S
L217	PFVF1B252SDT	COIL	S
L218	PFVF1B252SDT	COIL	S
L220	PFVF1B252SDT	COIL	S
L221	PFVF1B252SDT	COIL	S
L223	PFVF1B252SDT	COIL	S
L224	PFVF1B252SDT	COIL	S
L234	PFVF1B252SDT	COIL	S
L235	PFVF1B252SDT	COIL	S
L250	PFVF1B252SDT	COIL	S
L265	PFVF1B252SDT	COIL	S
L239	PQLQR1E32A07	COIL	S
L242	PQLQR1E32A07	COIL	S
L243	PFVF1B102SP	COIL	
L244	PFVF1B102SP	COIL	
L245	PFVF1B102SP	COIL	
L247	PQLQR1E32A07	COIL	S
L248	PQLQR1E32A07	COIL	S
L277	PFVF1B102SP	COIL	
		(RELAY)	
RLY200	PFSL003Z	RELAY	S
		(SWICH)	
SW200	PFSH1A011Z	SWITCH	
		(TRANSFORMER)	
T200	G4A1A0000151	TRANSFORMER	
		(VARISTORS)	
SA200	PQVDDSS301L	VARISTOR	!S
SA201	PFRZ002Z	VARISTOR	!S

Ref. No.	Part No.	Part Name & Description	Remarks
		(PHOTO ELECTRIC TRANSDUCERS)	
PC205	0N3181	PHOTO COUPLER	
PC206	PFVITLP320	PHOTO COUPLER	!
		(THERMISTOR)	
POS200	PQRPAR390N	THERMISTOR	!S
		(RESISTORS)	
J200	ERJ3GEY0R00	0	
J201	ERJ3GEY0R00	0	
J202	ERJ3GEY0R00	0	
J211	ERJ3GEY0R00	0	
J212	ERJ3GEY0R00	0	
J213	ERJ3GEY0R00	0	
L225	ERJ3GEY0R00	0	
L226	ERJ3GEY0R00	0	
L227	ERJ3GEY0R00	0	
L228	ERJ3GEY0R00	0	
L229	ERJ3GEY0R00	0	
L230	ERJ3GEY0R00	0	
L231	ERJ3GEY0R00	0	
L232	ERJ3GEY0R00	0	
L233	ERJ3GEY0R00	0	
L236	ERJ3GEY0R00	0	
L238	ERJ3GEY0R00	0	
L240	ERJ3GEY0R00	0	
L241	ERJ3GEY0R00	0	
L246	ERJ3GEYJ121	0	
L251	ERJ3GEY0R00	0	
L252	ERJ3GEY0R00	0	
L254	ERJ3GEY0R00	0	
L261	ERJ3GEY0R00	0	
L262	ERJ3GEY0R00	0	
L263	ERJ3GEY0R00	0	
L264	ERJ3GEY0R00	0	
L266	ERJ3GEYJ101	0	
L268	ERJ3GEY0R00	0	
L272	ERJ3GEY0R00	0	
L275	ERJ3GEYJ101	0	
L278	ERJ3GEY0R00	0	
L279	ERJ3GEY0R00	0	
L280	ERJ3GEY0R00	0	
L283	ERJ3GEY0R00	0	
R202	ERJ3GEYJ123	12k	
R204	ERJ3GEYJ103	10k	
R210	ERJ3GEY0R00	0	
R215	ERJ3GEYJ104	100k	
R216	ERJ3GEYJ104	100k	
R218	ERJ3GEYJ154	150k	
R219	ERJ3GEY0R00	0	
R220	ERJ3GEY0R00	0	
R224	ERJ3GEYJ203	20k	
R225	ERJ3GEYJ203	20k	
R226	PQ4R18XJ100	10	S
R229	ERJ3GEYJ473	47k	
R230	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R231	ERJ3GEYJ225	2.2M	
R232	ERJ3GEYJ393	39k	
R233	ERJ3GEYJ564	560k	
R234	ERJ3GEY0R00	0	
R235	ERJ3GEYJ473	47k	
R236	ERJ3GEYJ473	47k	
R237	ERJ3GEYJ154	150k	
R238	ERJ3GEYJ124	120k	
R239	ERJ3GEYJ473	47k	
R240	ERJ3GEYJ100	10	
R241	ERJ3GEYJ153	15k	
R242	ERJ3GEYJ244	240k	
R243	ERJ3GEYJ221	220	
R244	ERJ3GEY0R00	0	
R245	ERJ3GEYJ472	4.7k	
R246	ERJ3GEYJ103	10k	
R247	ERJ3GEYJ103	10k	
R249	ERJ3GEYJ4R7	4.7	
R250	ERJ3GEYJ102	1k	
R251	ERJ3GEYJ103	10k	
R254	ERG2SJ101	100	
R277	ERJ3GEYJ563	56k	
R281	ERJ3GEYJ334	330k	
R282	ERJ3GEYJ123	12k	
R283	ERJ3GEYJ204	200k	
R285	ERJ3GEYJ183	18k	
R290	ERDS1VJ333	33k	S
R291	ERJ3GEYJ124	120k	
R293	ERJ3GEYJ223	22k	
R295	ERJ3GEYJ224	220k	
R296	ERJ3GEYJ224	220k	
R297	ERJ3GEYJ274	270k	
R298	ERJ3GEYJ683	68k	
R299	ERDS1VJ103	10k	S
R300	ERJ3GEYJ820	82	
R301	ERJ3GEYJ820	82	
R302	ERJ3GEYJ820	82	
R303	ERJ3GEYJ332	3.3k	
R308	ERJ3GEYJ103	10k	
R309	ERJ3GEYJ103	10k	
R310	ERG2SJ151	150	
R312	ERJ3GEYJ681	680	
R313	ERJ3GEYJ152	1.5k	
R314	ERJ3GEYJ152	1.5k	
R319	ERJ3GEYJ153	15k	
R324	ERJ3GEYJ154	150k	
R332	ERJ3GEY0R00	0	
R336	ERJ3GEYJ332	3.3k	
R340	ERJ3GEYJ4R7	4.7	
R342	ERJ3GEYJ4R7	4.7	
R343	ERJ3GEYJ102	1k	
R344	ERJ3GEYJ103	10k	
		(CAPACITORS)	
C200	ECUV1A224KBV	0.22	

Ref. No.	Part No.	Part Name & Description	Remarks
C202	ECUV1C473KBV	0.047	
C214	ECUV1H101JCV	100p	
C216	ECUV1C104ZFV	0.1	
C218	ECEA1CKS100	10	S
C221	ECUV1C104ZFV	0.1	
C222	ECEA1VU101	100	S
C223	ECUV1C104KBV	0.1	
C224	ECUV1H333KBV	0.033	S
C225	ECUV1C123KBV	0.012	
C227	ECUV1H122KBV	0.0012	
C228	ECUV1H103KBV	0.01	
C229	ECUV1H470JCV	47p	
C231	ECUV1H681JCV	680p	S
C232	ECUV1C104KBV	0.1	
C234	ECEA1CK101	100	S
C235	ECUV1H103KBV	0.01	
C236	ECUV1H681JCV	680p	S
C237	ECEA1HKS4R7	4.7	S
C240	ECUV1H102KBV	0.001	
C241	ECUV1C104KBV	0.1	
C242	ECUV1A105ZFV	1	
C243	ECUV1A105ZFV	1	
C246	ECUV1H333KBV	0.033	S
C249	ECEA1CK101	100	S
C266	ECUV1C104KBV	0.1	
C267	ECUV1H330JCV	33p	
C268	ECUV1H681JCV	680p	S
C269	ECUV1H560JCV	56p	
C272	ECEA0JK221	220	S
C273	ECEA1CKS100	10	S
C274	ECUV1C104ZFV	0.1	
C276	ECUV1C104ZFV	0.1	
C277	ECUV1C104KBV	0.1	
C281	ECQE2E105KZ	1	S
C282	ECUV1H820JCV	82p	
C283	ECUV1H820JCV	82p	
C284	ECUV1H820JCV	82p	
C285	ECUV1H331JCV	330p	
C286	ECUV1H152KBV	0.0015	
C287	ECUV1H101JCV	100p	
C290	ECUV1C683KBV	0.068	
C291	ECUV1C683KBV	0.068	
C292	ECEA1CKS100	10	S
C293	ECUV1H103KBV	0.01	
C294	ECEA1CK470	47	S
C302	ECUV1C104KBV	0.1	
C303	ECUV1H101JCV	100p	
C304	ECUV1H182KBV	0.0018	
C305	ECUV1H182KBV	0.0018	
C319	ECUV1C104ZFV	0.1	
C320	ECUV1H101JCV	100p	
C323	ECEA1CK101	100	S
C324	ECUV1A224KBV	0.22	
C325	ECUV1C683KBV	0.068	

Ref. No.	Part No.	Part Name & Description	Remarks
C327	ECUV1H104ZFV	0.1	S

12.5. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP2FL511M	OPERATION BOARD ASS'Y (RTL)	
PCB3-1	K0L1AA000001	SWITCH,SET	
		(IC)	
IC101	C1ZBZ0002089	IC	
		(DIODES)	
LED101	PQVDSLR325MC	LED	S
LED102	PQVDR325CA47	LED	S
D101	1SS133	DIODE(SI)	S
D102	1SS133	DIODE(SI)	S
D103	1SS133	DIODE(SI)	S
		(CONNECTOR)	
CN102	PQJP8G43Y	(CONNECTOR,8P)	S
		(LIQUID CRYSTAL DISPLAY)	
CN101	L5DAAFB00001	LCD	
		(PHOTO ELECTRIC TRANSDUCER)	
PS101	CNA1006N	PHOTO SENSOR	
		(THERMISTOR)	
TH101	D4CC11030019	THERMISTOR	
		(SWITCHES)	
SW101	EVQ11Y05B	SWITCH	
SW102	EVQ11Y05B	SWITCH	
SW103	EVQ11Y05B	SWITCH	
SW104	EVQ11Y05B	SWITCH	
SW105	EVQ11Y05B	SWITCH	
SW106	EVQ11Y05B	SWITCH	
SW107	EVQ11Y05B	SWITCH	
SW108	EVQ11Y05B	SWITCH	
SW109	EVQ11Y05B	SWITCH	
SW110	EVQ11Y05B	SWITCH	
SW111	EVQ11Y05B	SWITCH	
SW112	EVQ11Y05B	SWITCH	
SW113	EVQ11Y05B	SWITCH	
SW114	EVQ11Y05B	SWITCH	
SW115	EVQ11Y05B	SWITCH	
SW116	EVQ11Y05B	SWITCH	
SW117	EVQ11Y05B	SWITCH	
SW118	EVQ11Y05B	SWITCH	
SW119	EVQ11Y05B	SWITCH	
SW120	EVQ11Y05B	SWITCH	
SW121	EVQ11Y05B	SWITCH	
SW122	EVQ11Y05B	SWITCH	
SW123	EVQ11Y05B	SWITCH	
SW124	EVQ11Y05B	SWITCH	
SW125	EVQ11Y05B	SWITCH	
SW126	EVQ11Y05B	SWITCH	
SW127	EVQ11Y05B	SWITCH	
SW128	EVQ11Y05B	SWITCH	
SW129	EVQ11Y05B	SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
SW130	EVQ11Y05B	SWITCH	
SW131	EVQ11Y05B	SWITCH	
SW132	EVQ11Y05B	SWITCH	
SW133	EVQ11Y05B	SWITCH	
SW134	EVQ11Y05B	SWITCH	
SW135	EVQ11Y05B	SWITCH	
SW136	EVQ11Y05B	SWITCH	
SW137	EVQ11Y05B	SWITCH	
SW138	EVQ11Y05B	SWITCH	
SW139	EVQ11Y05B	SWITCH	
SW140	EVQ11Y05B	SWITCH	
SW141	EVQ11Y05B	SWITCH	
SW142	EVQ11Y05B	SWITCH	
SW143	EVQ11Y05B	SWITCH	
SW144	EVQ11Y05B	SWITCH	
SW145	EVQ11Y05B	SWITCH	
SW146	K0L1AA000001	SWITCH	POM
		(RESISTORS)	
J164	ERJ3GEY0R00	0	
J165	ERJ3GEY0R00	0	
J166	ERJ3GEY0R00	0	
J167	ERJ3GEY0R00	0	
R102	ERJ3GEYJ123	12k	
R103	ERJ3GEYJ181	180	
R104	ERJ3GEYJ123	12k	
R105	ERJ3GEYJ181	180	
R106	ERJ3GEYJ123	12k	
R107	ERJ3GEYJ181	180	
R110	ERJ3GEYJ181	180	
R112	ERJ3GEYJ181	180	
R113	ERJ3GEYJ181	180	
R114	ERJ3GEYJ181	180	
R115	ERJ3GEYJ181	180	
R116	ERJ3GEYJ181	180	
R117	ERJ3GEYJ181	180	
R118	ERJ3GEYJ181	180	
R119	ERJ3GEYJ563	56k	
R120	ERJ3GEYJ331	330	
R121	ERJ3GEYJ472	4.7k	
R123	ERJ3GEYJ123	12k	
R127	ERJ3GEYJ103	10k	
R128	ERJ3GEYJ223	22k	
R129	ERJ3GEY0R00	0	
R130	ERJ3GEYJ101	100	
R131	ERJ3GEYJ101	100	
R133	ERJ3GEYJ122	1.2k	
R134	ERJ3GEYJ101	100	
R135	ERJ3GEYJ101	100	
R138	ERJ3GEYJ331	330	
R139	ERJ3GEYJ331	330	
R146	ERJ3GEYJ101	100	
R147	ERJ3GEYJ123	12k	
R148	ERJ3GEYJ4R7	4.7	
R149	ERJ3GEYJ123	12k	

Ref. No.	Part No.	Part Name & Description	Remarks
R152	ERJ3GEYJ181	180	
		(CAPACITORS)	
C103	ECEA1CK101	100	S
C104	ECUV1C104ZFV	0.1	
C105	ECUV1C104ZFV	0.1	
C106	ECUV1H103KBV	0.01	
C110	ECUV1C104ZFV	0.1	
C111	ECUV1C104ZFV	0.1	
C112	ECEA1CKS100	10	S
C115	ECUV1H101JCV	100p	
C117	ECUV1H101JCV	100p	
C118	ECUV1H101JCV	100p	
C119	ECUV1H103KBV	0.01	
C120	ECUV1C104ZFV	0.1	
C122	ECUV1C104ZFV	0.1	
C125	ECUV1C104ZFV	0.1	
C128	ECUV1H101JCV	100p	
C129	ECUV1H101JCV	100p	
C130	ECUV1H101JCV	100p	
C132	ECEA1CK101	100	S
C133	ECUV1C104ZFV	0.1	
C139	ECUV1C104ZFV	0.1	

12.6. HIGH VOLTAGE POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	EUKMBN889HA	HIGH BOLTAGE POWER SUPPLY BOARD ASS'Y (RTL)	
		(IC)	
IC101	AN6742S	IC	
		(TRANSISTORS)	
Q101	2SB709A	TRANSISTOR(SI)	
Q102	2SB709A	TRANSISTOR(SI)	
Q103	2SD2137A	TRANSISTOR(SI)	
Q201	2SD2137A	TRANSISTOR(SI)	
Q202	2SA1699	TRANSISTOR(SI)	
		(DIODE)	
D104	PFVDDHM3FJ60	DIODE(SI)	S
D105	PFVDDHM3FJ60	DIODE(SI)	S
D107	PFVDERA1504	DIODE(SI)	S
D109	PFVDDHM3M20	DIODE(SI)	S
D201	PFVDERA1504	DIODE(SI)	S
D203	PFVDDHM3M20	DIODE(SI)	S
D204	PFVDERA1504	DIODE(SI)	S
D205	PFVDDHM3M20	DIODE(SI)	S
ZD201	PFVDRD62ESAB	ZENER DIODE	S
ZD202	PFVDRD150EB	ZENER DIODE	S
		(CONNECTOR)	
CN2	PFJP06B01Z	CONNECTOR,6P	
		(CAPACITORS)	
C101	PFEUKMG1V470	47	S
C102	ECQV1H473JZ	0.047	
C103	PFEUKMG1H2R2	2.2	S
C104	PFEUKMG1H010	1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C105	ECJ2VB1H103K	0.01	
C108	ECJ2FB1H473K	0.047	
C109	ECJ2VB1H153K	0.015	
C110	ECKK3F471KBP	470p	
C111	ECKK3D471KBB	470p	
C112	ECKK3D471KBB	470p	
C201	ECJ2FB1H473K	0.047	
C202	ECJ2VB1H102K	0.001	
C203	ECKK3D221KB	220p	
C204	ECJ2VB1H103K	0.01	
C205	ECKR2H102KB	0.001	
C207	ECKK3D102KB	0.001	
C209	ECKR2H101KB5	100p	
		(FUSE)	
IP101	PFBAICPN38	FUSE	S
		(RESISTORS)	
R101	PQ4R10XJ473	47k	S
R102	ERDS2TJ104	100k	
R104	ERDS2TJ103	10k	
R105	ERJ6ENF2003	200k	
R106	PQ4R10XJ103	10k	S
R107	ERDS2TJ103	10k	
R108	ERDS2TJ103	10k	
R109	ERDS2TJ272	2.7k	
R110	PQ4R10XJ103	10k	S
R111	PQ4R10XJ103	10k	S
R112	PQ4R10XJ103	10k	S
R113	ERJ6ENF1004	1M	
R114	PQ4R10XJ103	10k	S
R116	PQ4R10XJ272	2.7k	S
R117	PQ4R10XJ000	0	S
R118	PQ4R10XJ000	0	S
R119	PFRGH16A306N	30M	S
R120	ERDS2TJ152	1.5k	
R121	ERDS2TJ152	1.5k	
R123	ER0S2TKF8451	8.45k	
R124	ERJ6ENF1003	100k	
R125	PQ4R10XJ000	0	S
R126	PQ4R10XJ102	1k	S
R127	PFRGVR25J106	10M	S
R202	ERJ6ENF4872	48.7k	
R203	PQ4R10XJ102	1k	S
R204	ERDS2TJ473	47k	
R205	ERDS1TJ224	220k	
R206	ER0S2TKF4532	45.3k	S
R207	PFRGR25F1504	1.5M	S
R208	PFRGVR25J105	1M	S
R209	PFRGVR25J105	1M	S
R210	ERDS2TJ333	33k	
R211	PFRGR25F1005	10M	S
R212	PFRGVR25J105	1M	
R213	PFRGVR25J105	1M	
R214	PFRGVR25J106	10M	⚠S
		(SWITCH)	

Ref. No.	Part No.	Part Name & Description	Remarks
SW101	PFSEDE2LCJ33	SWITCH	⚠S
		(COILS)	
T101	ETB20DKA1	COIL	⚠
T201	ETB20DKD1	COIL	⚠

12.7. LOW VOLTAGE POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	ETXKM450A5B	LOW VOLTAGE POWER BORD ASSY (RTS)	
		(ICs)	
IC101	PFVIFA5317P	IC	S
IC201	PFVIPQ05RD11	IC	S
		(TRANSISTORS)	
Q101	2SK2543	TRANSISTOR(SI)	⚠
Q201	2SC1740S	TRANSISTOR(SI)	S
		(DIODES)	
D101	PFVDGPP20JT3	DIODE(SI)	⚠S
D102	PFVDGPP20JT3	DIODE(SI)	⚠S
D103	PFVDGPP20JT3	DIODE(SI)	⚠S
D104	PFVDGPP20JT3	DIODE(SI)	⚠S
D105	PFVD05NU42	DIODE(SI)	S
D106	PSVDERA9102	DIODE(SI)	S
D108	PSVDERA9102	DIODE(SI)	S
D109	PSVD10ELS4	DIODE(SI)	S
D110	PFVDERA9102	DIODE(SI)	
D201	PFVDYG901C2R	DIODE(SI)	S
D202	PFVD21DQ04	DIODE(SI)	S
ZD101	MA4300	ZENER DIODE	
ZD102	MA4180	ZENER DIODE	
ZD201	MA4062N	ZENER DIODE	
		(CONNECTORS)	
CN101	PQJP2D98Z	CONNECTOR,2P	S
CN102	PQJP2D98Z	CONNECTOR,2P	S
CN201	PFJP08B01Z	CONNECTOR,8P	S
		(CAPACITORS)	
C101	ECQU2A224MG	0.22	⚠
C102	ECQU2A224MG	0.22	⚠
C103	PFCKDCS222MY	0.0022	⚠S
C104	PFCKDCS222MY	0.0022	⚠S
C105	PFCKDCS222MY	0.0022	⚠S
C106	EETLD2D221B	220	⚠
C107	ECQE4103RKF	0.01	
C109	ECKN3A221KRP	220p	
C110	EEUFC1V390	39	
C111	ECQB1H102JF	0.001	
C112	ECQV1H224JZ	0.22	
C113	ECQB1H471JF	470p	
C115	ECQB1H103JF	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C116	ECQU2A104ML	0.1	⚠
C201	PFCKD2R102K	1000p	S
C202	EEUFC1V102	1000	
C204	EEUFC1C102	1000	
C206	EEUFC1A151	150	
C208	ECQV1H474JZ	0.47	
C212	ECQV1H474JZ	0.47	
		(COILS)	
L101	PFLQF15N013A	COIL	⚠S
L102	PFLQF15N017A	COIL	⚠S
L103	PFLQSTP02C73	COIL	⚠S
L105	PQLE53	COIL	S
L202	PQLE53	COIL	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	PQVIPC817A	PHOTO COUPLER	⚠S
PC102	PFVIS21ME6NY	PHOTO COUPLER	⚠S
PC103	PQVIPC817A	PHOTO COUPLER	⚠S
		(RESISTORS)	
R101	ERDS1TJ105	1M	
R102	ERG2SJ104	100k	
R103	ERG2SJ221	220	
R104	ERDS2TJ472	4.7k	
R105	ERX2SJR22	0.22	
R106	ERDS2TJ473	47k	
R107	ERDS2TJ473	47k	
R110	ER0S2TKF2700	270	
R111	ERDS2TJ150	15	
R112	ERDS2TJ181	180	
R113	ERDS2TJ220	22	
R114	ERDS2TJ682	6.8k	
R115	ER0S2TKF1502	15k	
R116	ER0S2TKF1000	100	
R117	ERDS2TJ123	12k	
R119	PFRDRF16J151	150	S
R120	ERDS2TJ470	47	
R121	ERG1SJ121	120	
R122	ER0S2TKF1502	15k	
R203	ERDS2TJ272	2.7k	
R204	ERDS2TJ102	1k	
R205	ERDS2TJ472	4.7k	
R206	ERDS2TJ562	5.6k	
R207	ERDS2TJ103	10k	
R208	ER0S2TKF6801	6.8k	
R209	ER0S2TKF1801	1.8k	
R212	ER0S2TKF3301	3.3k	
R213	ERDS2TJ221	220	
R214	ERDS2TJ102	1k	
R215	ERDS2TJ562	5.6k	
		(FUSES)	
F101	PFBA215315	FUSE	⚠S
F102	PFBA215010	FUSE	⚠S

Ref. No.	Part No.	Part Name & Description	Remarks
		(TRANSFORMER)	
T101	ETB29AC1U5	TRANSFORMER	⚠
		(THERMISTOR)	
TH101	PFRTD210D5R0	THERMISTOR	S
		(VARISTOR)	
ZNR101	ERZVGAD471	VARISTOR	⚠
		(COMPONENTS PART)	
SCR101	PFXFTM1661SE	TRIAC	⚠S

12.8. EXIT SENSOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PFLP1481MZ-B	EXIT SENSOR BOARD ASS'Y (RTL)	
		(PHOTO ELECTRIC TRANSDUCER)	
PS51	PFVIRM574SL	PHOTO SENSOR	S
		(CONNECTORS)	
CN51	PQJP03A21Z	CONNECTOR,3P	S
CN52	PQJP5G43Y	CONNECTOR,5P	S
		(CAPACITOR)	
C52	ECUV1H271KBV	270p	

12.9. DRUM AND TONER SENSOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB7	PFLP1481MZ-C	DRUM & TONER SENSOR BORD ASS'Y (RTL)	
		(IC)	
IC60	B4ABC0000001	IC	
		(CONNECTOR)	
CN60	PQJP4G30Z	CONNECTOR,4P	S
		(SWITCH)	
SW60	PFSH1A005Z	SWITCH	S
		(CAPACITOR)	
C60	ECUV1C104ZFV	0.1	

12.10. VARISTOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB8	PFLP1481MZ-D	VARISTOR BOARD ASS'Y (RTL)	
		(VARISTOR)	
ZNR71	PFRV271NS05K	VARISTOR	

12.11. FIXTURES AND TOOLS

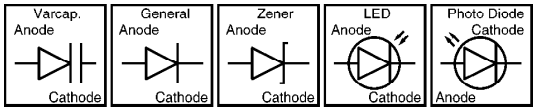
Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ6K7Z	EXTENSION CORD, 6P	
EC2	PQZZ8K18Z	EXTENSION CORD, 8P	
EC3	PFZZ5K13Z	EXTENSION CORD, 5P	
EC4	PQZZ28F1Z	EXTENSION CORD, 28P	
EC5	PQZZ4K5Z	EXTENSION CORD, 4P	
EC6	PQZZ7K5Z	EXTENSION CORD, 7P	
EC7	PQZZ2K12Z	EXTENSION CORD, 2P	
EC8	PQZZ3K5Z	EXTENSION CORD, 3P	
EC9	PFZZFL501M	EXTENSION CORD, 5P	
EC10	PQZZ8K15Z	EXTENSION CORD, 8P	
	PFZZFL501M	TOOL FOR WRITING PROGRAM INTHE FLASH ROM.	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE (for training service technicians)	

Note:
Tools and Extension Cords are useful for servicing.
(They make servicing easy.)

13. FOR THE SCHEMATIC DIAGRAMS

Note:

1. **DC voltage measurements are taken with an oscilloscope or a tester with a ground.**
2. **The schematic diagrams and circuit board may be modified at any time with the development of new technology.**
3.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

14. SCHEMATIC DIAGRAM

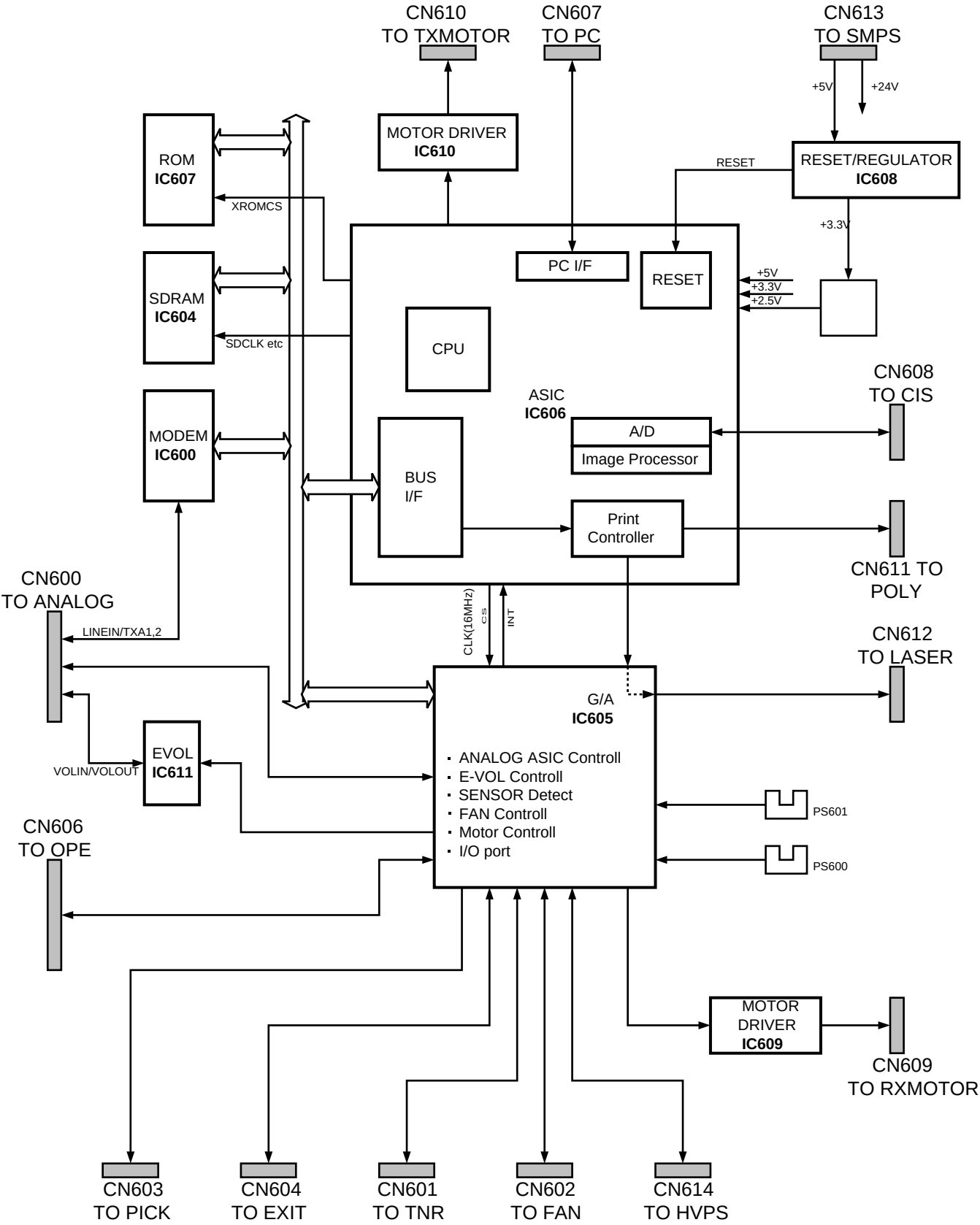
14.1. DIGITAL BOARD (PCB1)

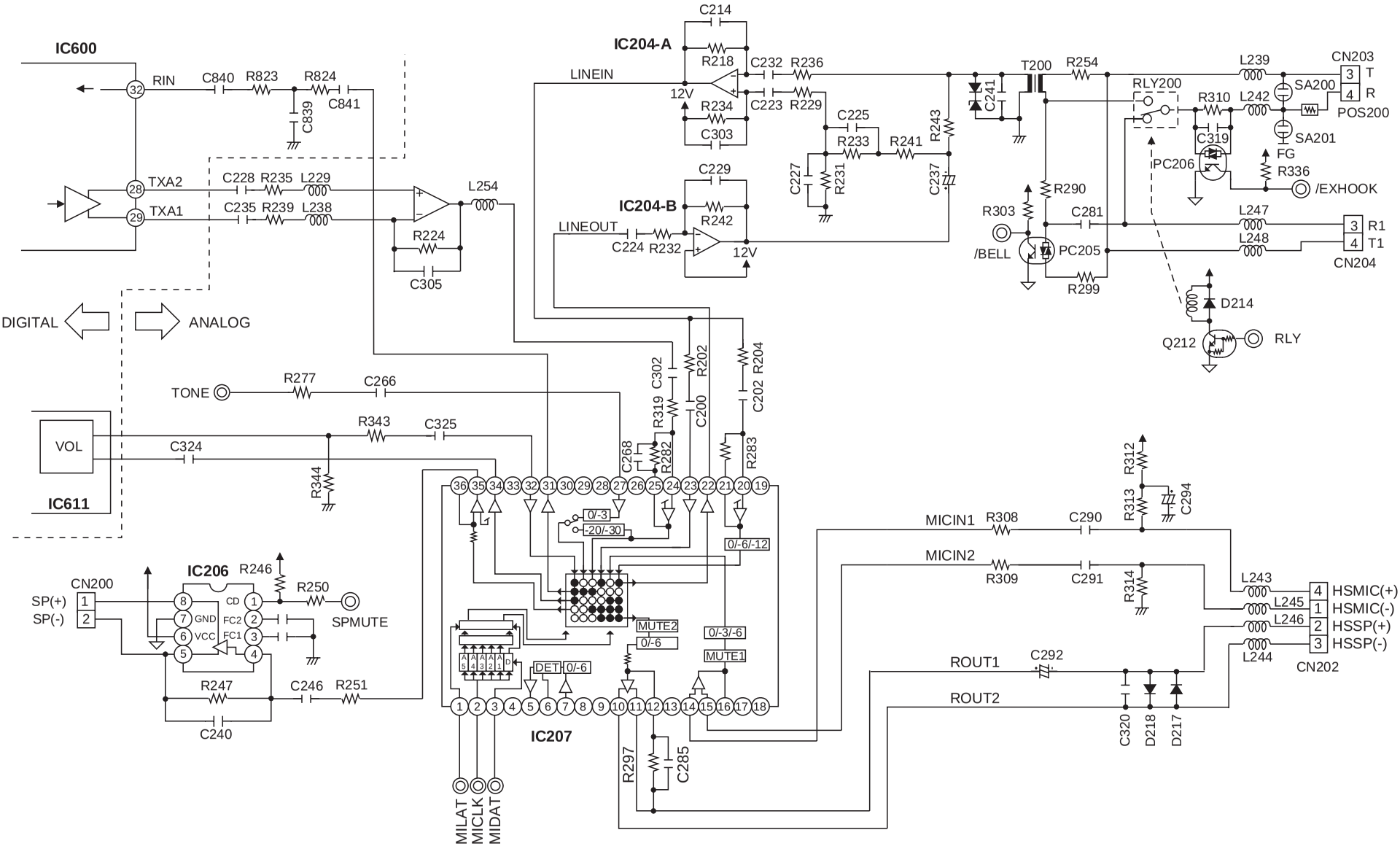
15. SCHEMATIC DIAGRAM

15.1. ANALOG BOARD (PCB2)

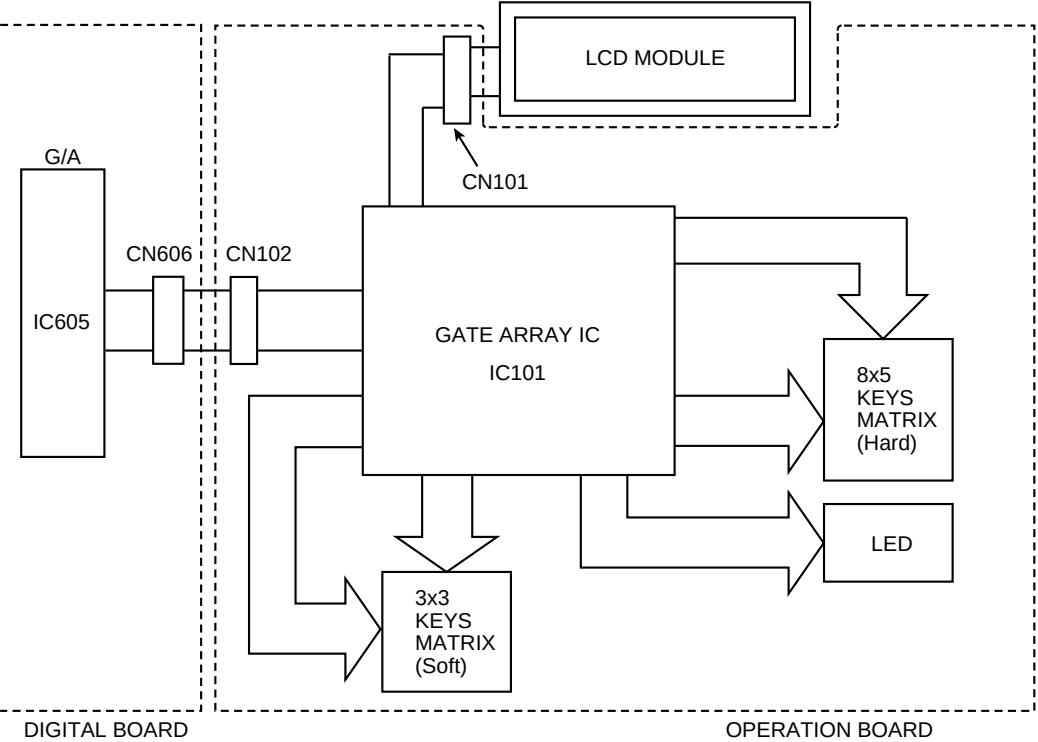
15.2. OPERATION BOARD (PCB3)

15.3. HIGH VOLTAGE POWER SUPPLY BOARD (PCB4)
15.4. LOW VOLTAGE POWER SUPPLY BOARD (PCB5)
15.5. EXIT SENSOR BOARD (PCB6)
15.6. DRUM AND TONER SENSOR BOARD (PCB7)
15.7. VARISTOR BOARD (PCB8)
16. PRINTED CIRCUIT BOARD
16.1. DIGITAL BOARD (PCB1)
16.1.1. DIGITAL BOARD: COMPONENT VIEW
16.1.2. DIGITAL BOARD: BOTTOM VIEW
16.2. ANALOG BOARD (PCB2)
16.2.1. ANALOG BOARD: COMPONENT VIEW
16.2.2. ANALOG BOARD: BOTTOM VIEW
16.3. OPERATION BOARD (PCB3)
16.3.1. OPERATION BOARD:COMPONENT VIEW
16.3.2. OPERATION BOARD:BOTTOM VIEW
16.4. HIGH VOLTAGE POWER SUPPLY BOARD (PCB4)
16.4.1. HIGH VOLTAGE POWER SUPPLY BOARD:COMPONENT VIEW
16.4.2. HIGH VOLTAGE POWER SUPPLY BOARD:BOTTOM VIEW
16.5. LOW VOLTAGE POWER SUPPLY BOARD (PCB5)
16.5.1. LOW VOLTAGE POWER SUPPLY BOARD:COMPONENT VIEW
16.5.2. LOW VOLTAGE POWER SUPPLY BOARD:BOTTOM VIEW
16.6. EXIT SENSOR BOARD PARTS (PCB6)
16.7. DRUM AND TONER SENSOR BOARD (PCB7)
16.8. VARISTOR BOARD (PCB8)

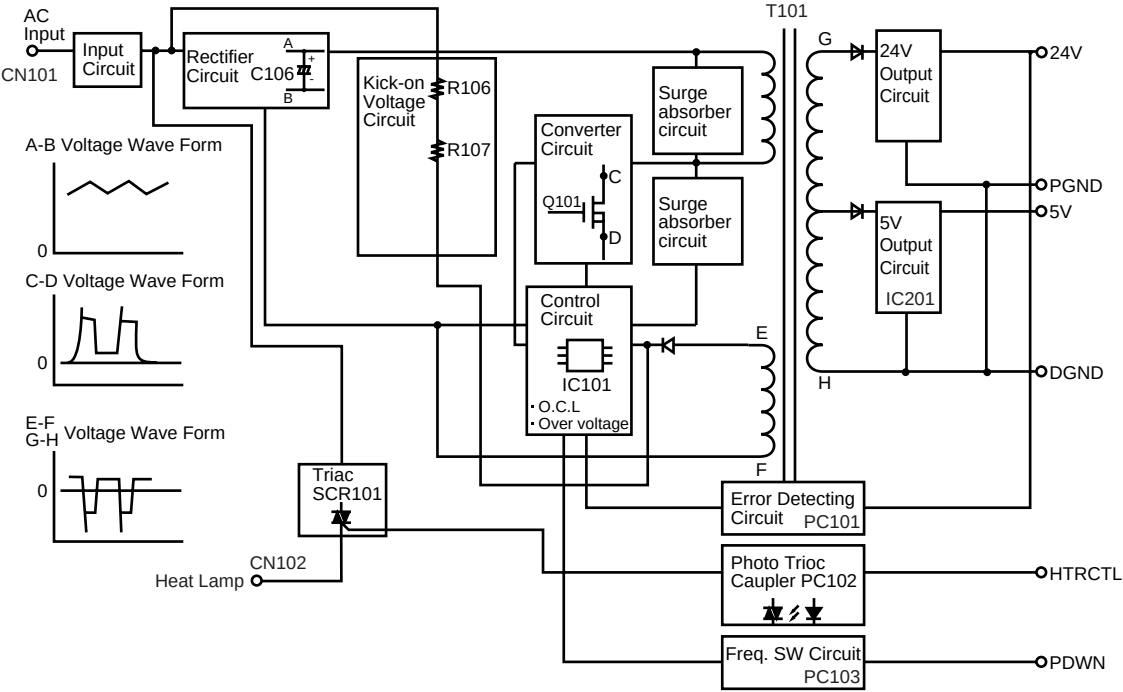

CN610
TO TXMOTOR
CN607
TO PC
CN613
TO SMPS
+5V
+24V
MOTOR DRIVER
IC610
RESET/REGULATOR
IC608
RESET
+3.3V
ROM
IC607
XROMCS
PC I/F
RESET
+5V
+3.3V
+2.5V
SDRAM
IC604
SDCLK etc
CPU
CN608
TO CIS
ASIC
IC606
A/D
Image Processor
MODEM
IC600
BUS
I/F
Print
Controller
CN611 TO
POLY
CN600
TO ANALOG
LINEIN/TXA1,2
CLK(16MHz)
CS
INT
CN612
TO LASER
G/A
IC605
EVOL
IC611
VOLIN/VOLOUT
ANALOG ASIC Controll
E-VOL Controll
SENSOR Detect
FAN Controll
Motor Controll
I/O port
PS601
PS600
CN606
TO OPE
MOTOR
DRIVER
IC609
CN609
TO RXMOTOR
CN603
TO PICK
CN604
TO EXIT
CN601
TO TNR
CN602
TO FAN
CN614
TO HVPS

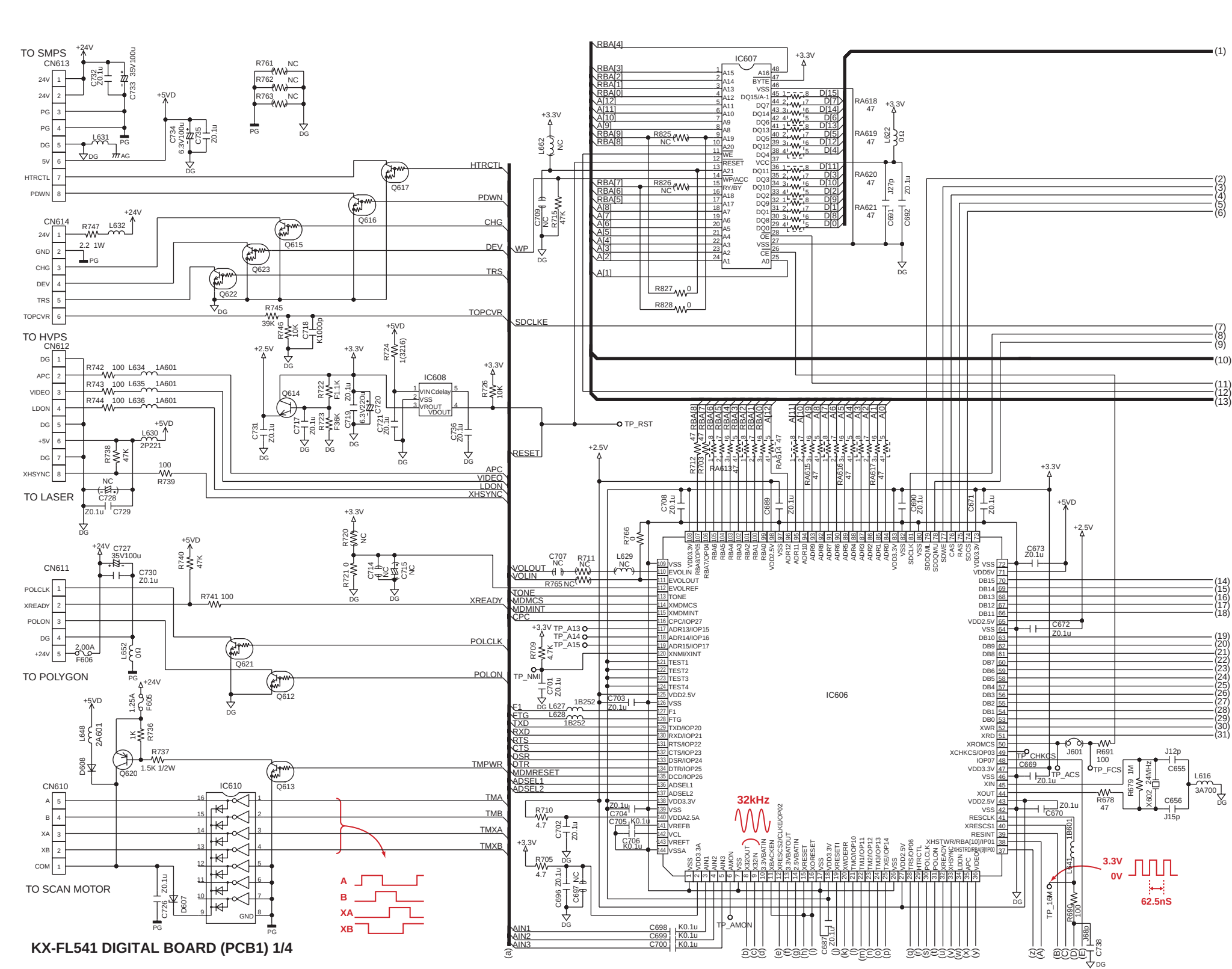


KX-FL541:ANALOG BOARD:BLOCK DIAGRAM

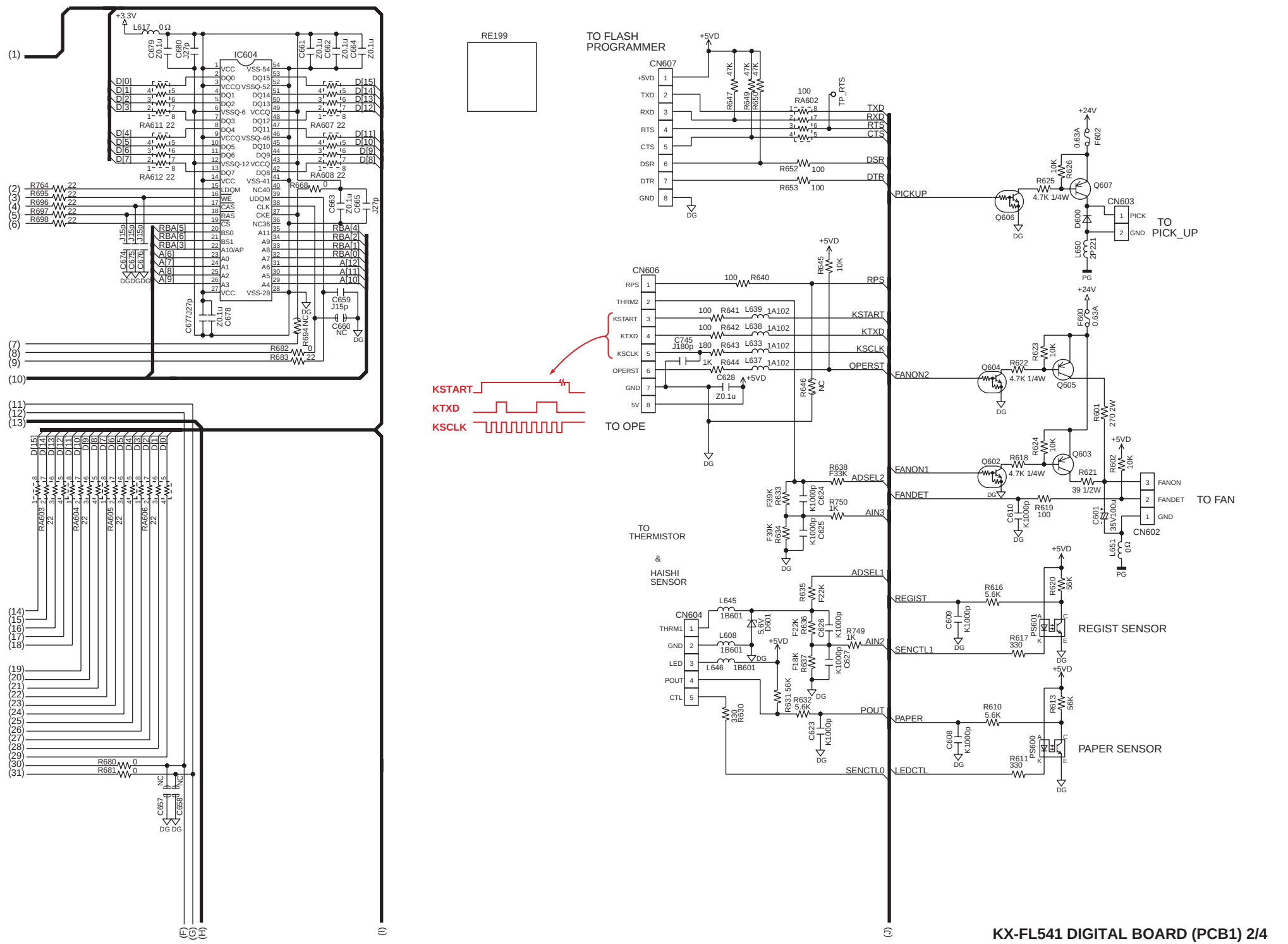

LCD MODULE
CN101
G/A
IC605
CN606
CN102
GATE ARRAY IC
IC101
8x5
KEYS
MATRIX
(Hard)
LED
3x3
KEYS
MATRIX
(Soft)
DIGITAL BOARD
OPERATION BOARD

Block Diagram

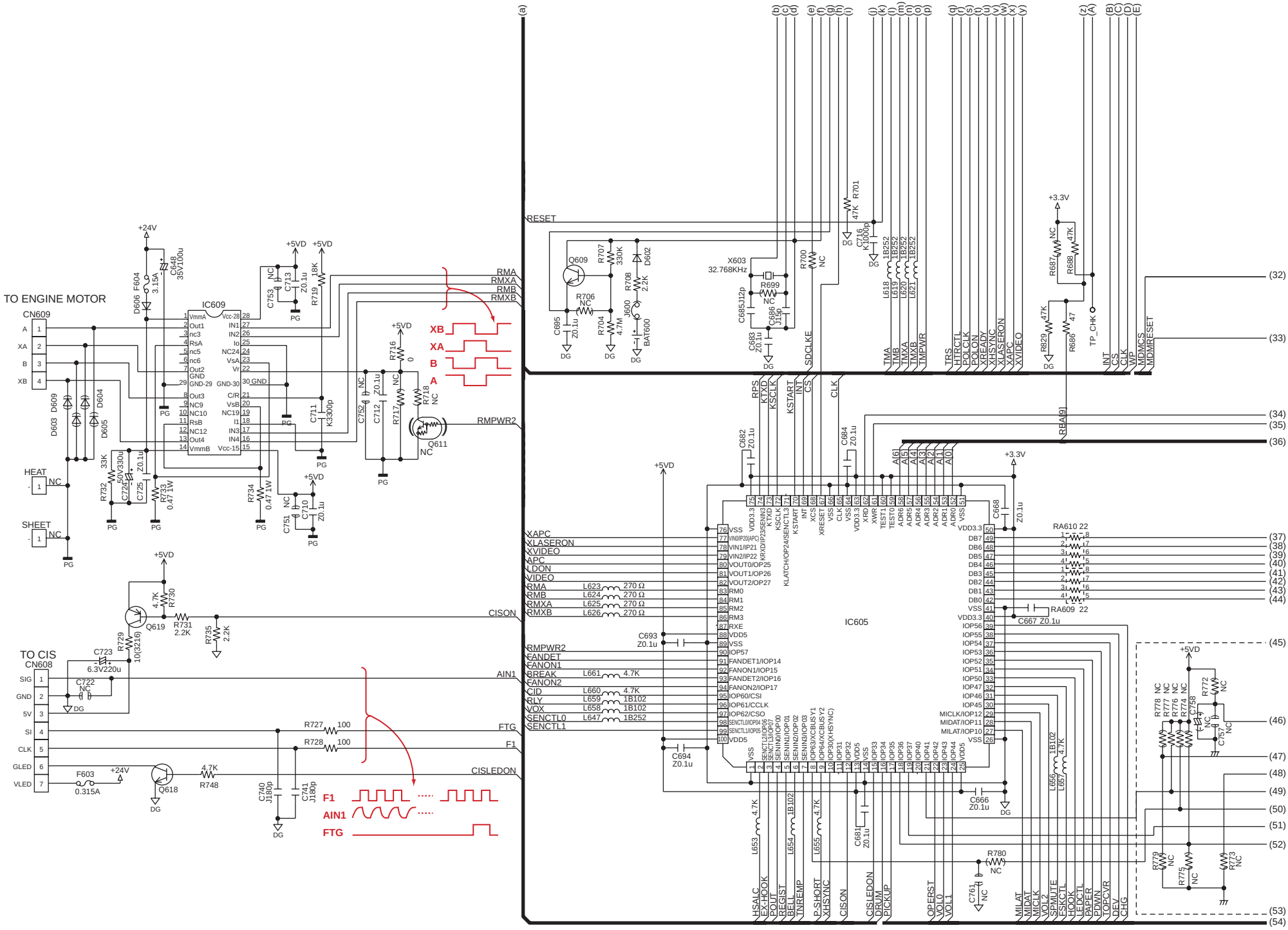




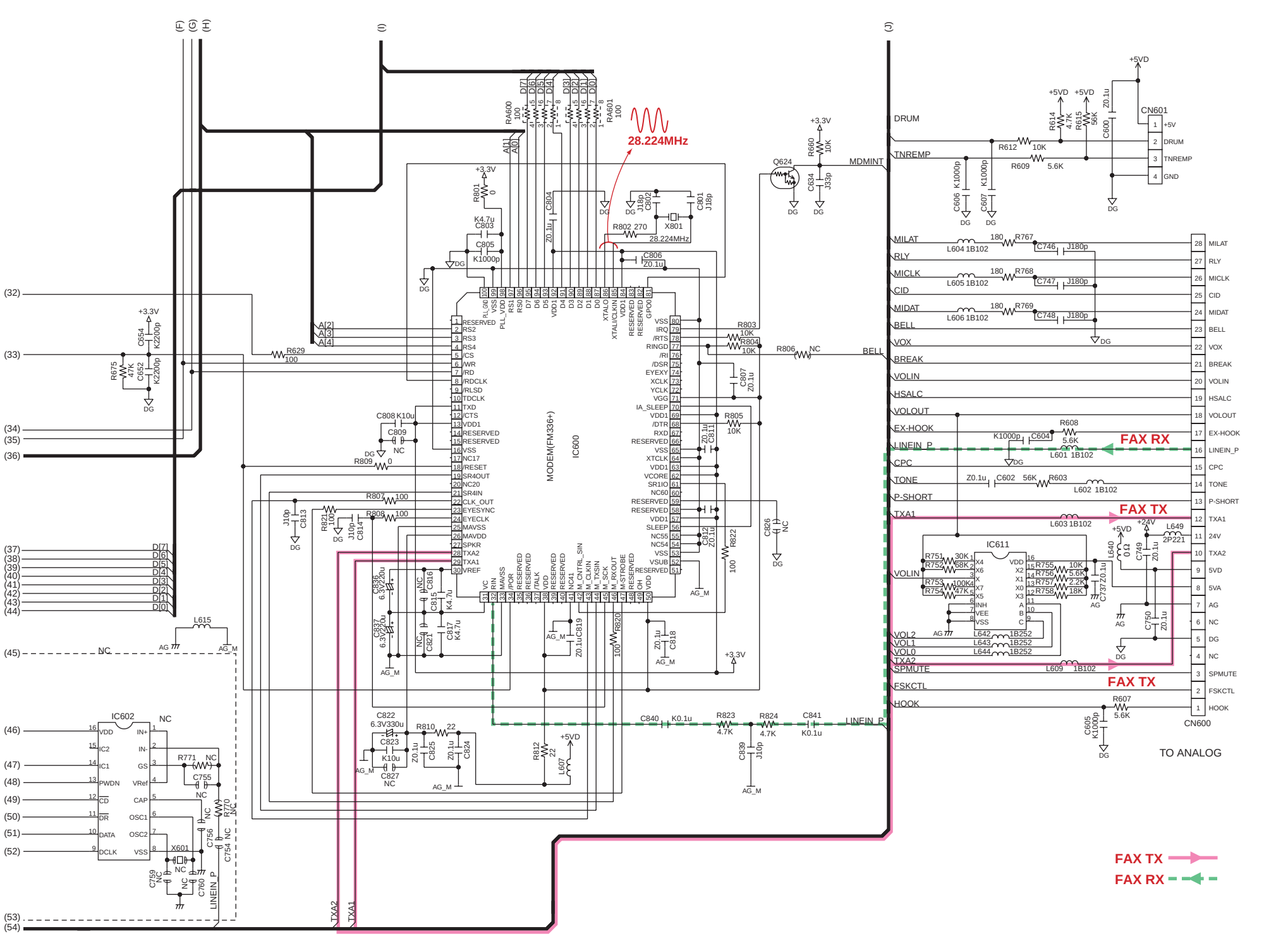
KX-FL541 DIGITAL BOARD (PCB1) 1/4



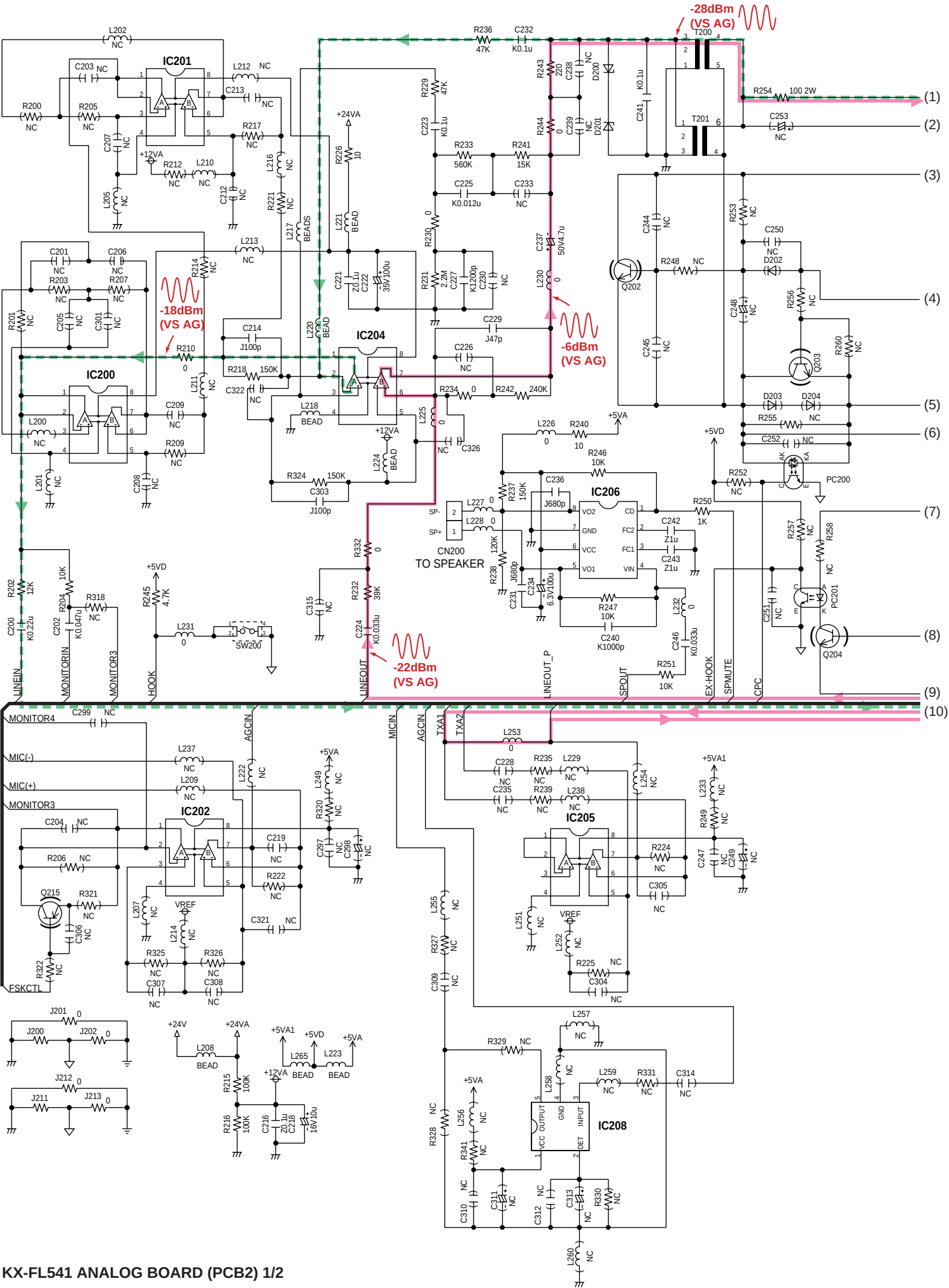
KX-FL541 DIGITAL BOARD (PCB1) 2/4



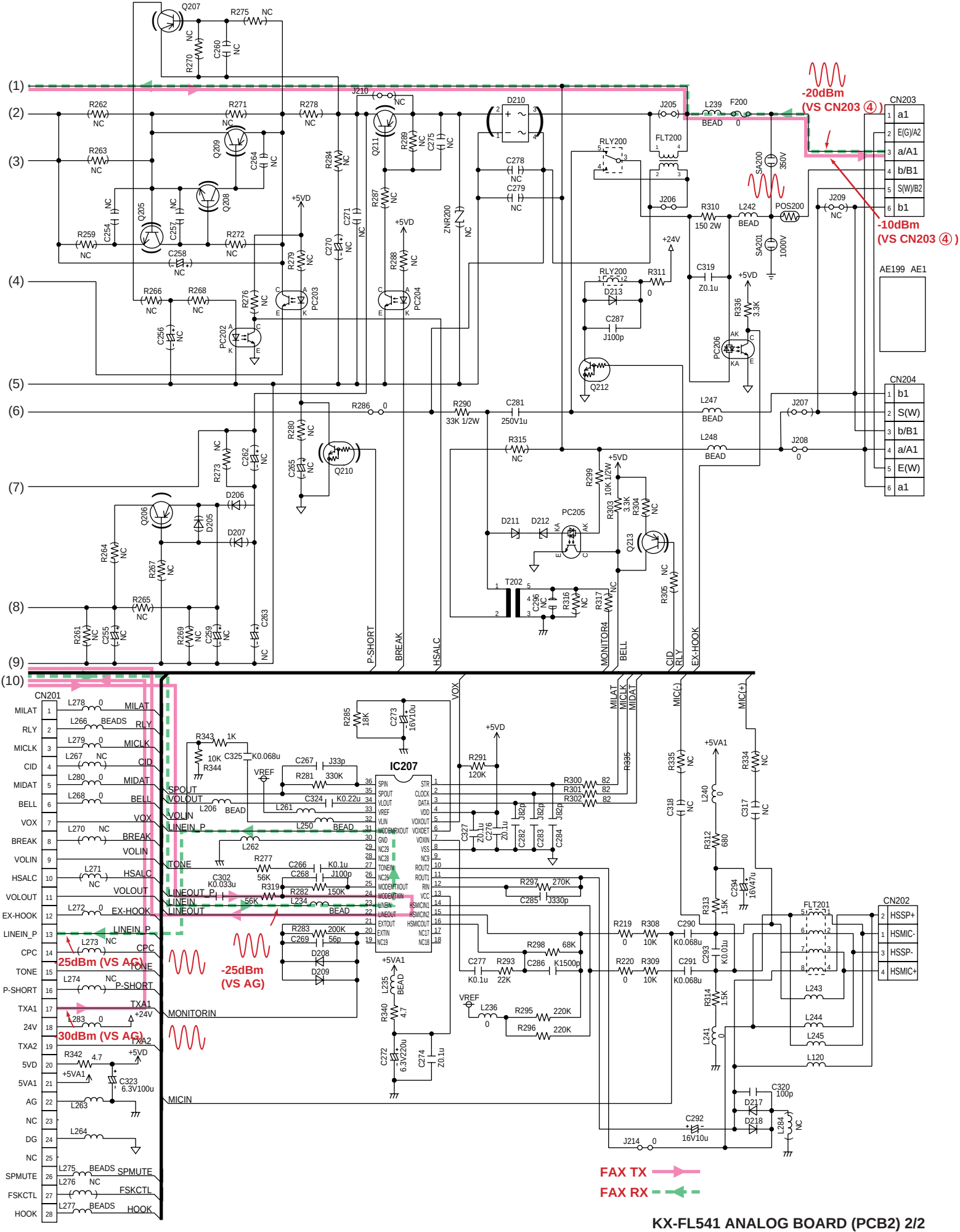
KX-FL541 DIGITAL BOARD (PCB1) 3/4



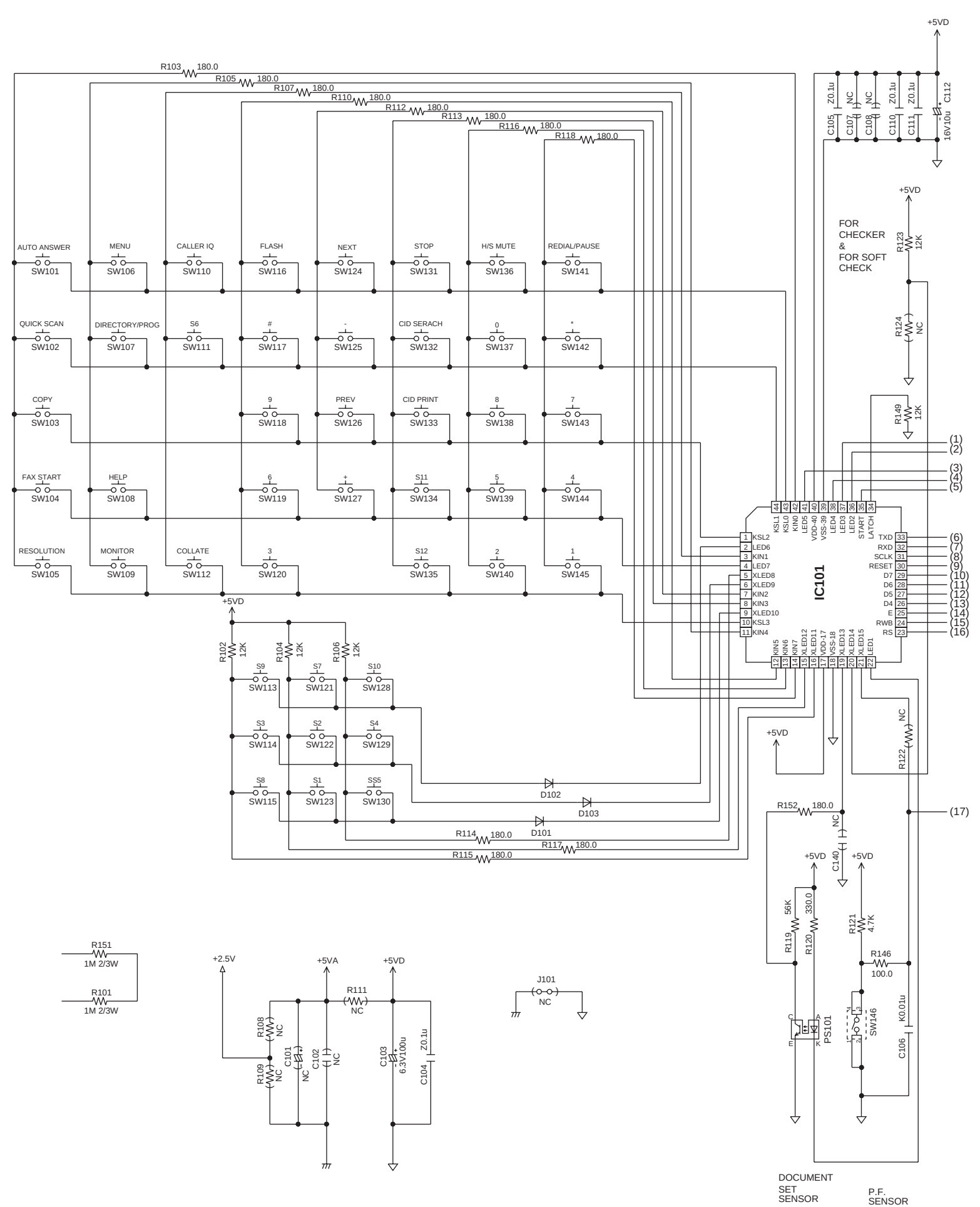
KX-FL541 DIGITAL BOARD (PCB1) 4/4



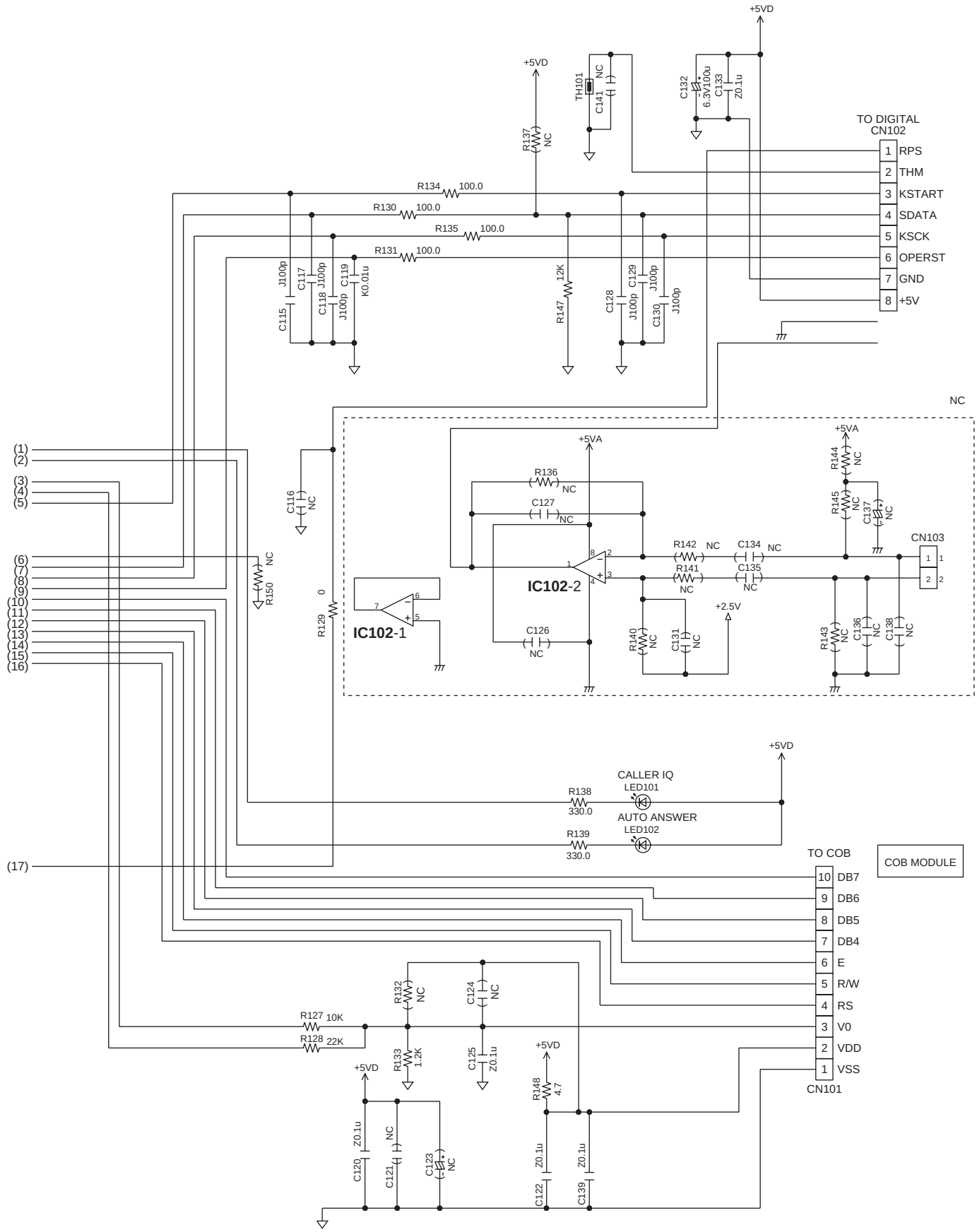
KX-FL541 ANALOG BOARD (PCB2) 1/2



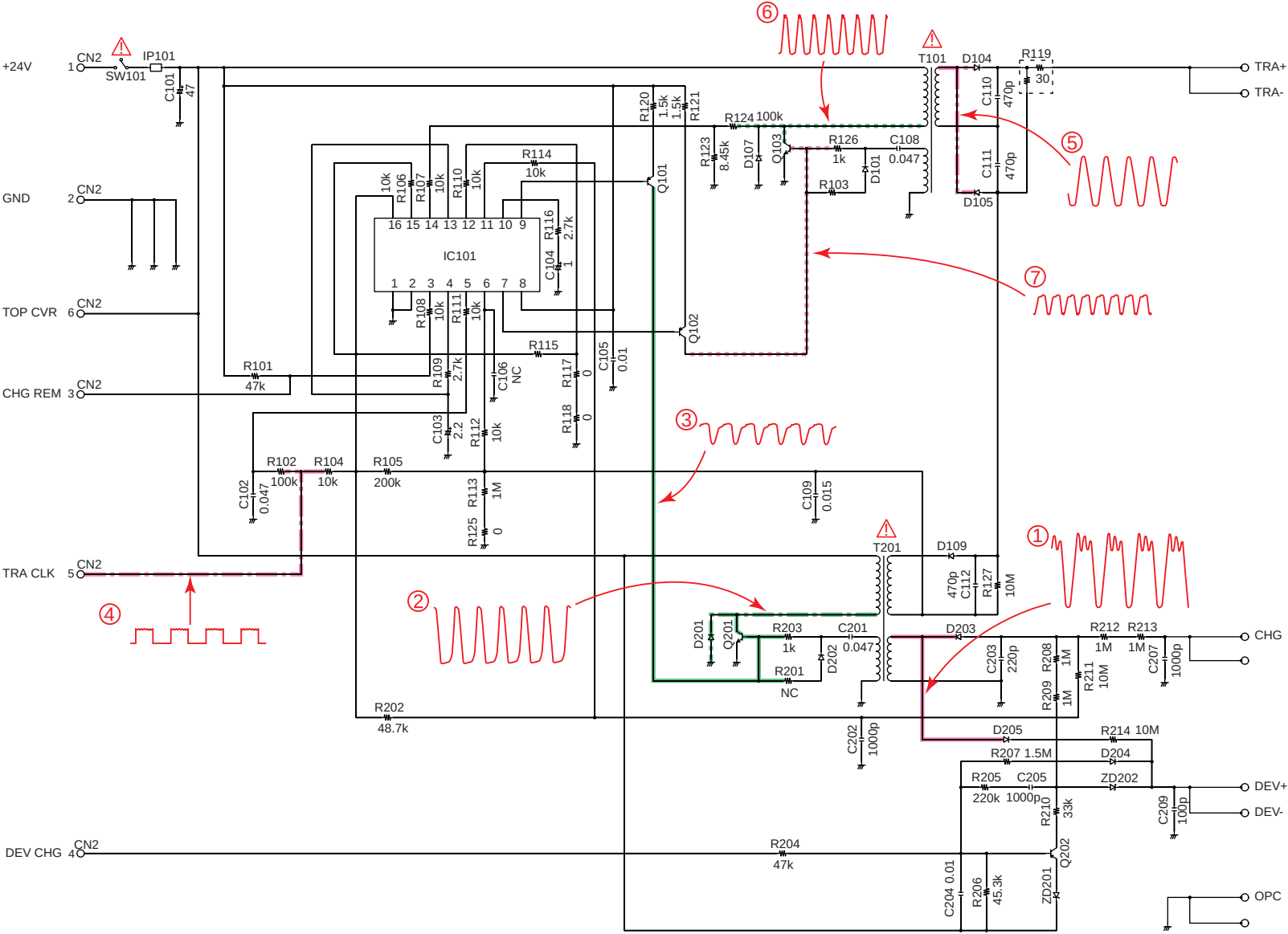
KX-FL541 ANALOG BOARD (PCB2) 2/2



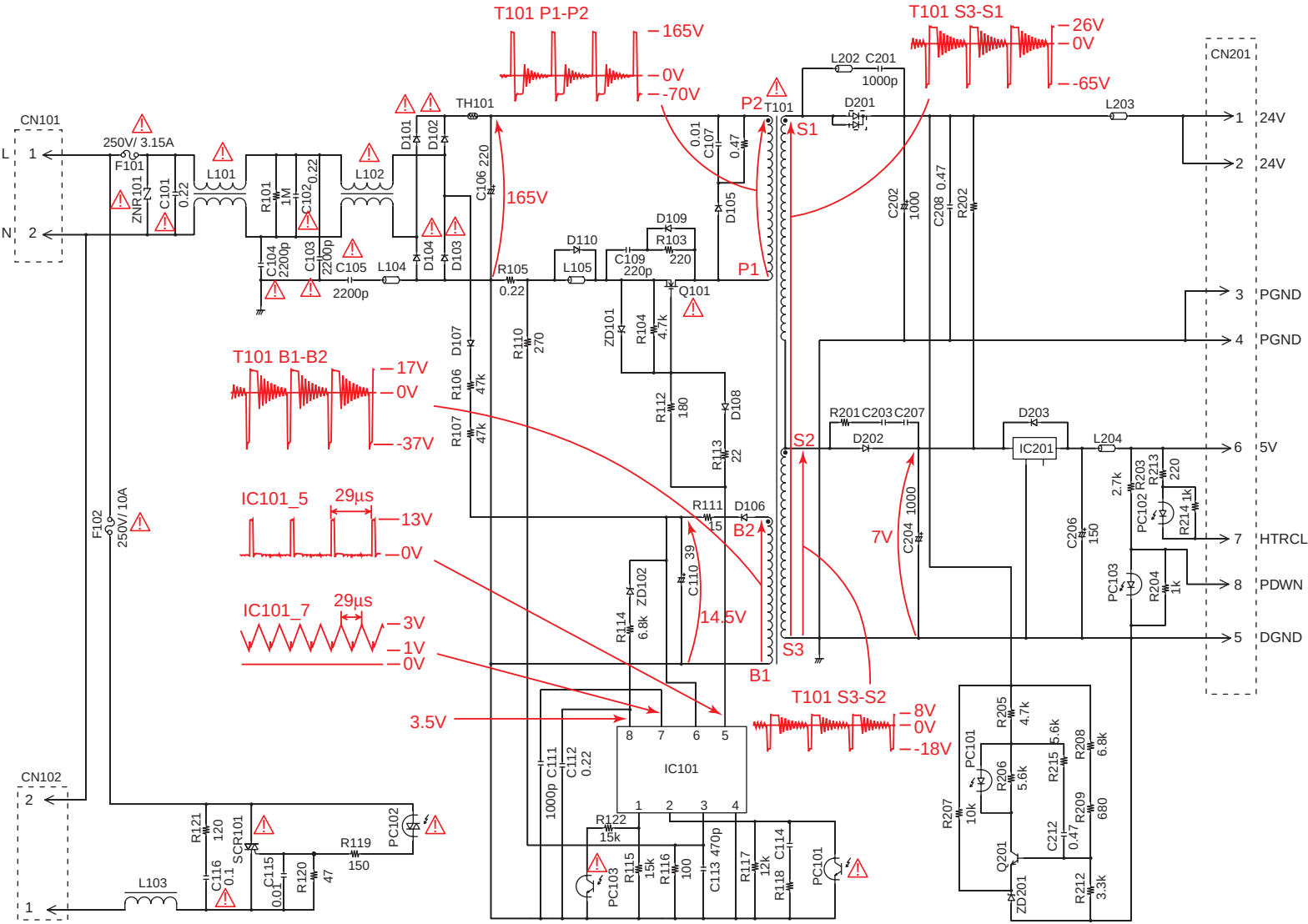
KX-FL541 OPERATION BOARD (PCB3) 1/2



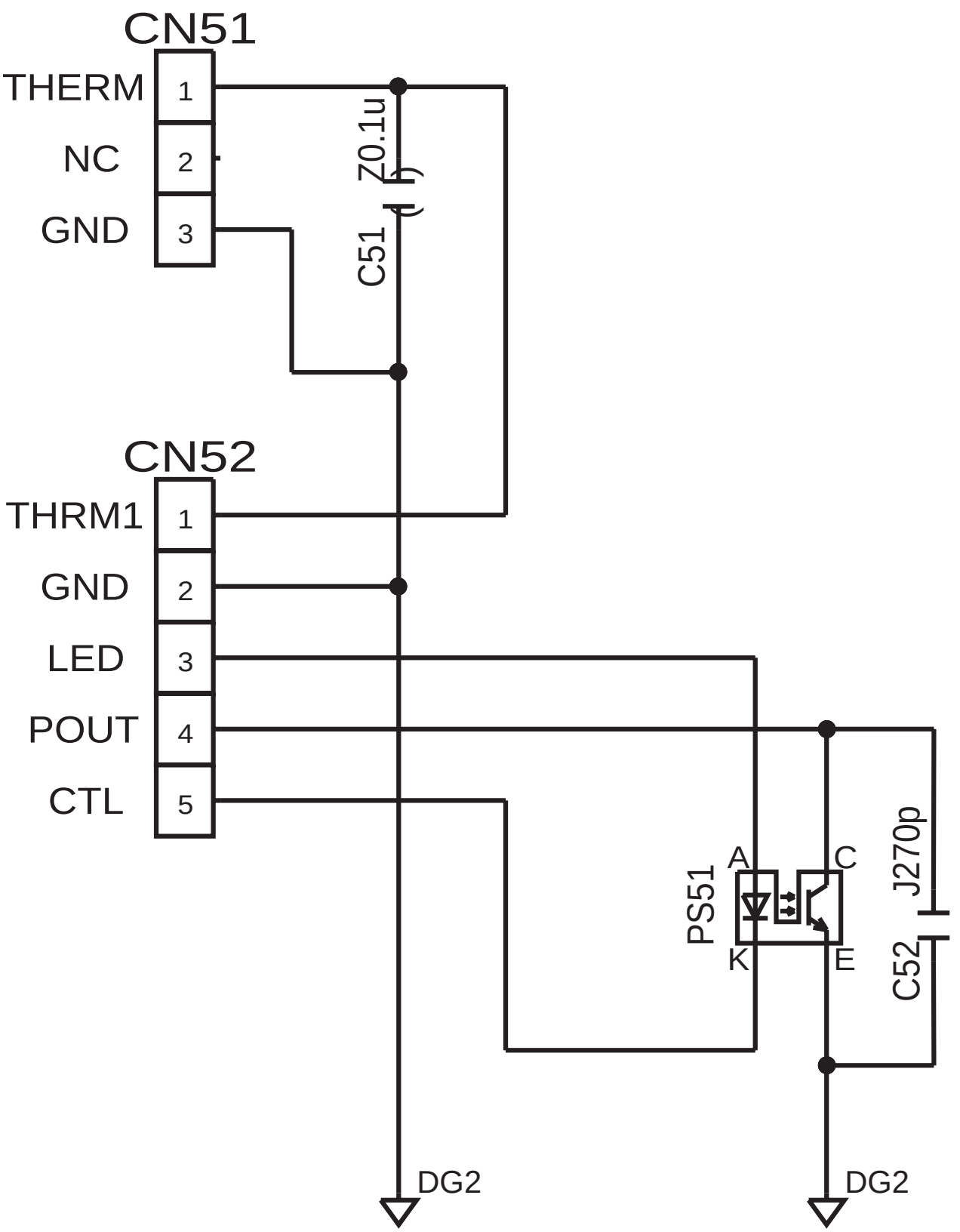
KX-FL541 OPERATION BOARD (PCB3) 2/2



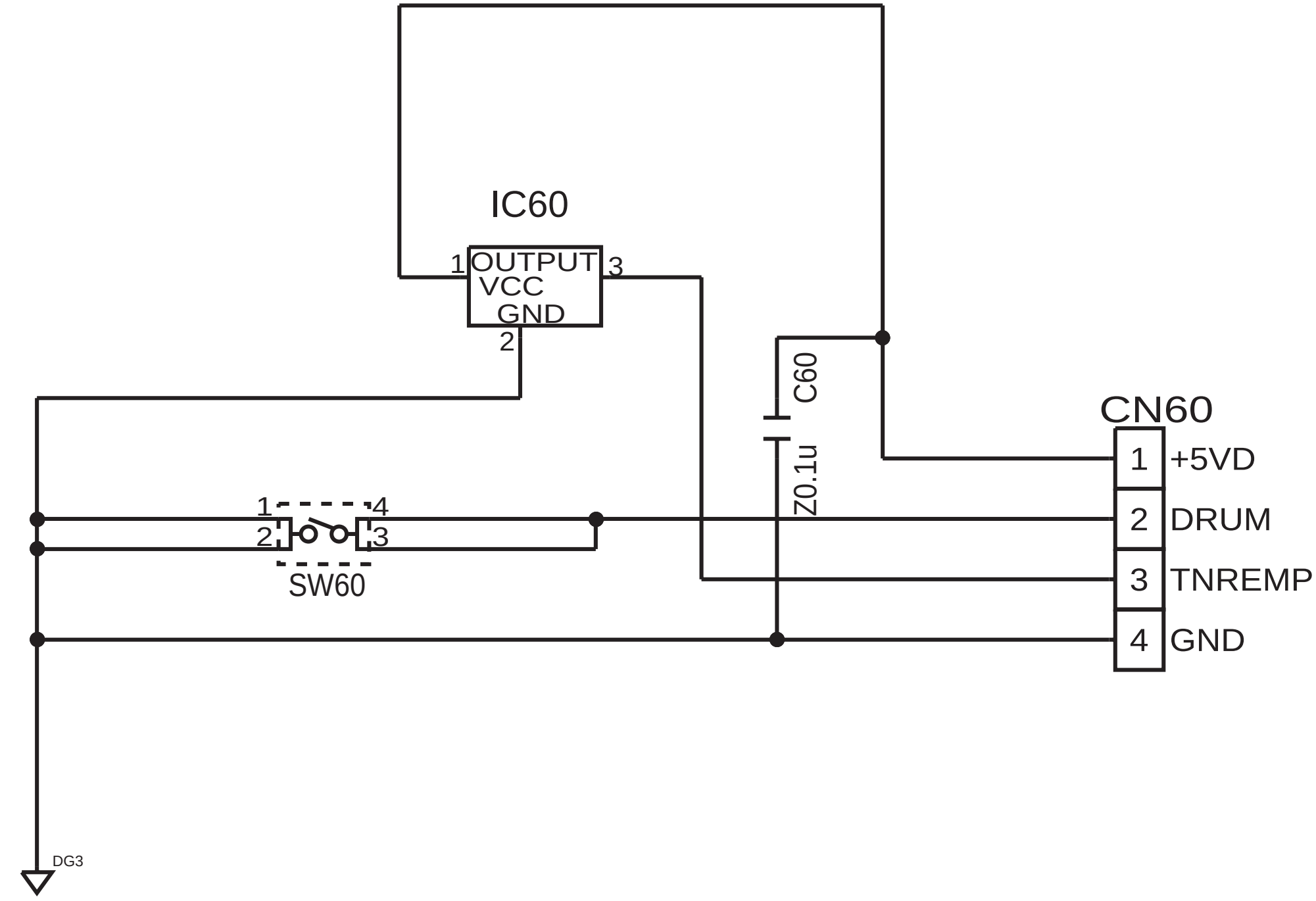
KX-FL541 HIGH VOLTAGE POWER SUPPLY BOARD (PCB4)



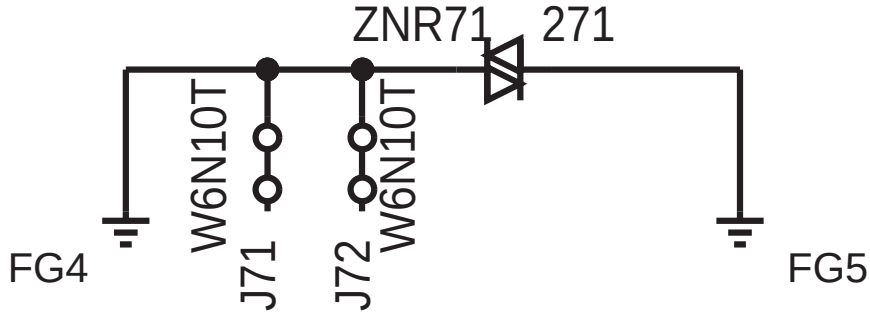
KX-FL541 LOW VOLTAGE POWER SUPPLY BOARD (PCB5)



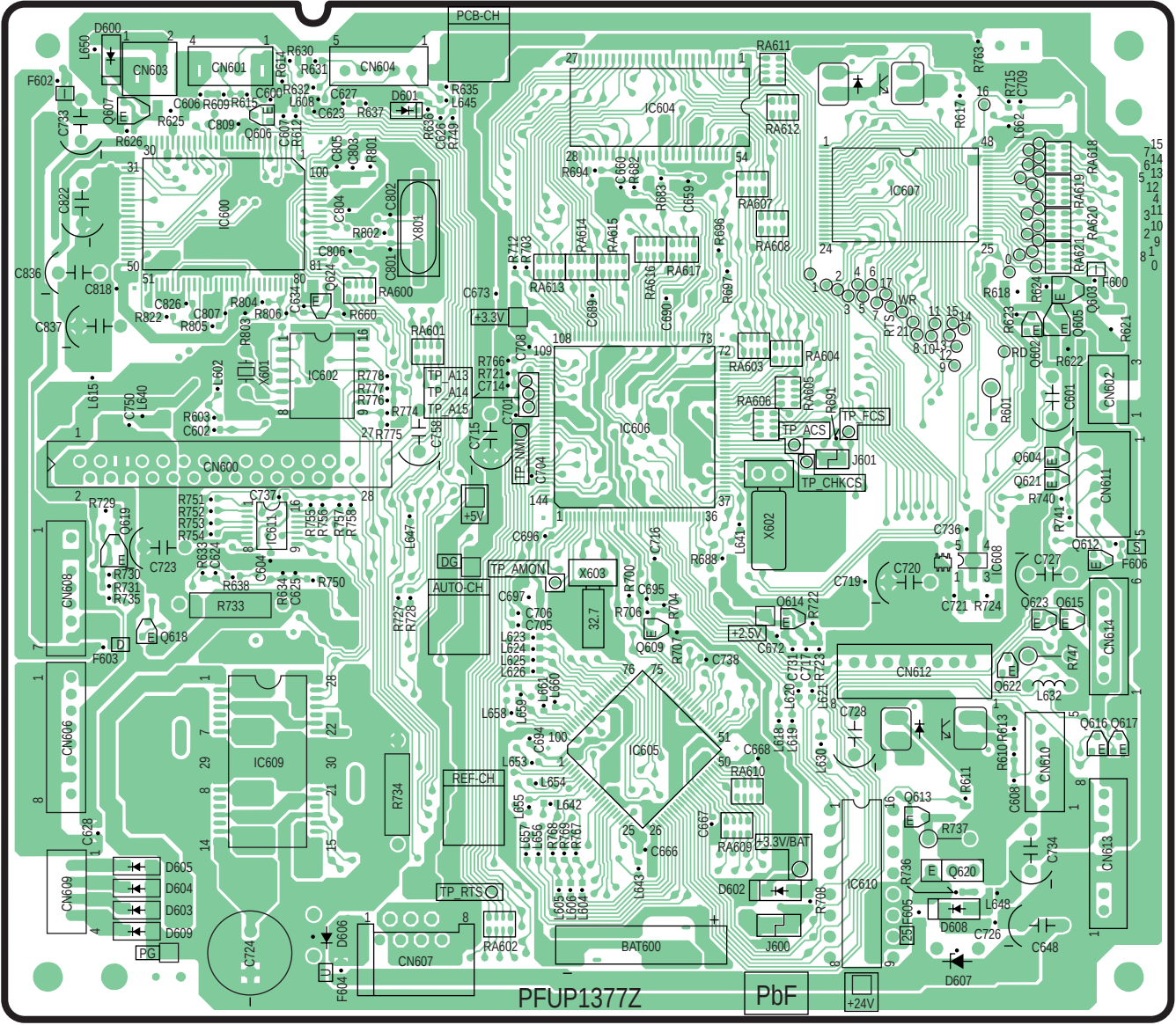
KX-FL541 EXIT SENSOR BOARD (PCB6)



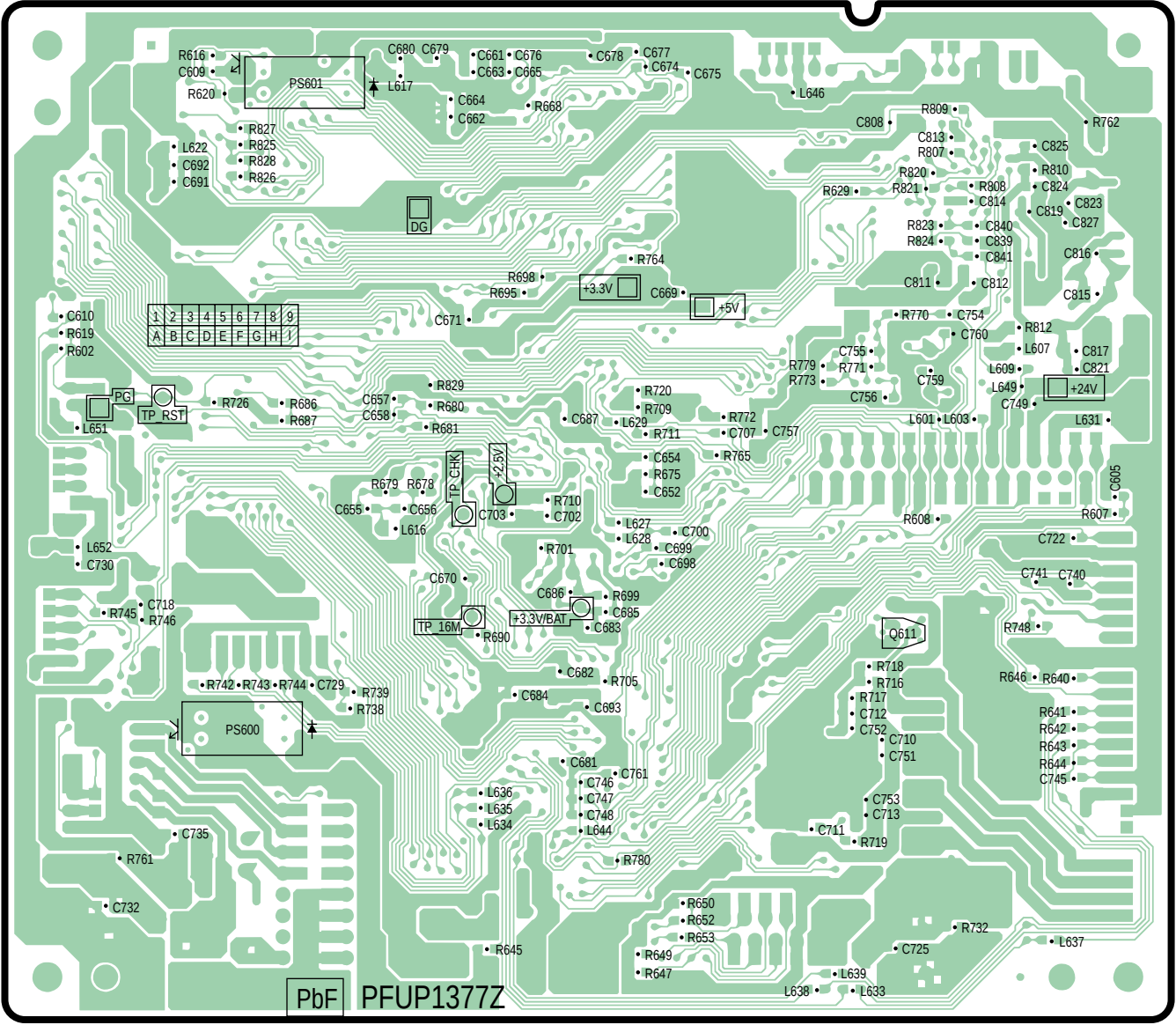
KX-FL541 DRUM AND TONER SENSOR BOARD (PCB7)



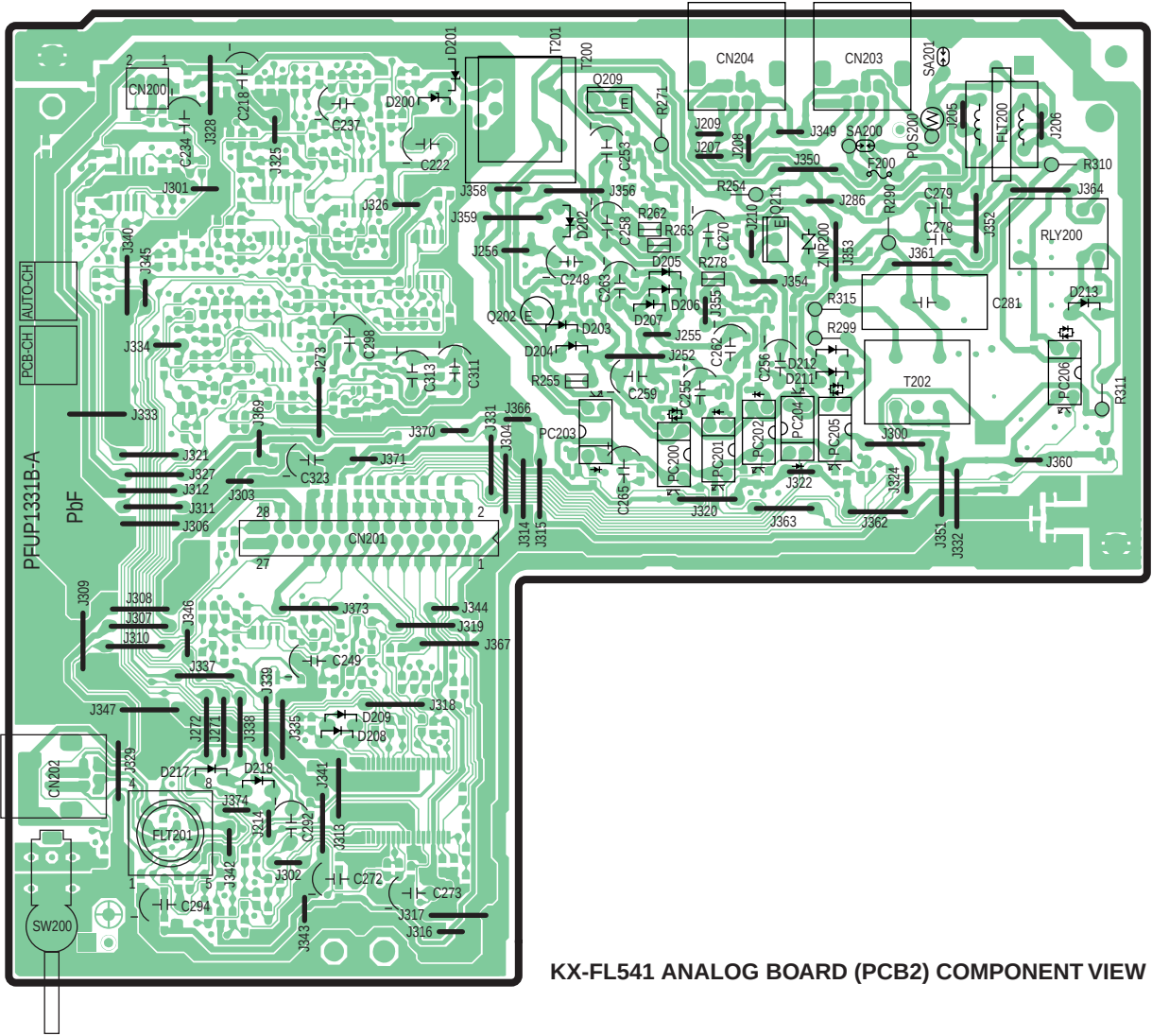
KX-FL541 VARISTOR BOARD (PCB8)



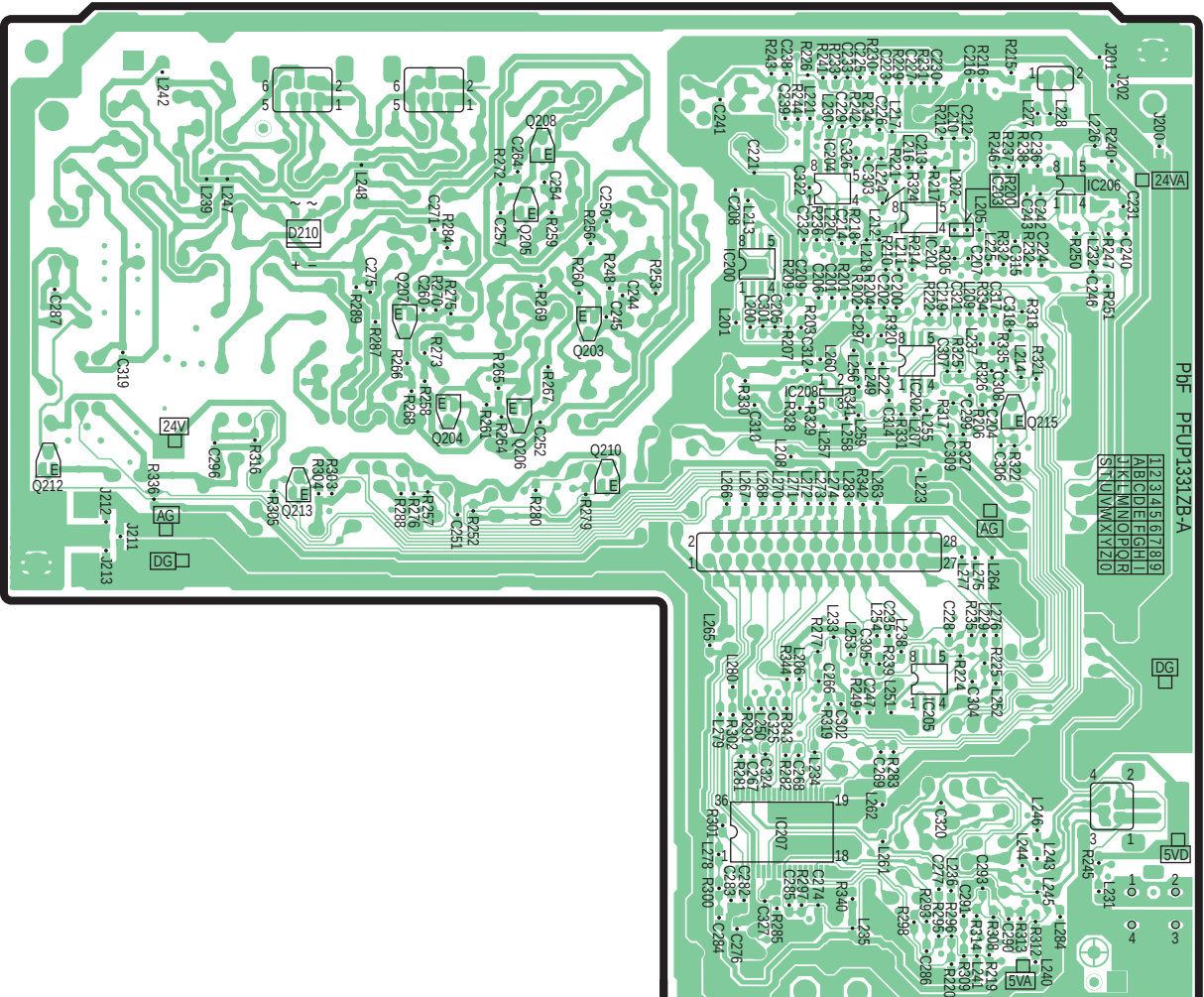
KX-FL541 DIGITAL BOARD (PCB2) COMPONENT VIEW



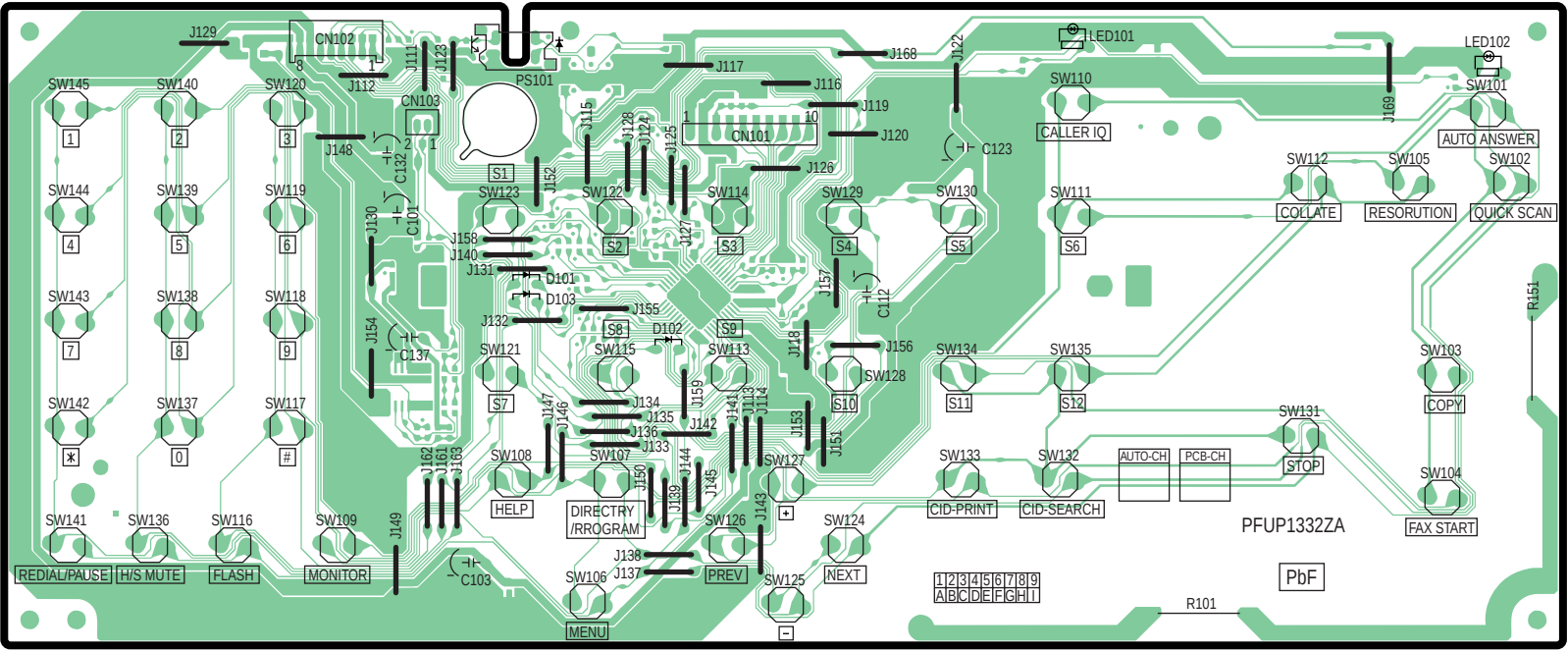
KX-FL541 DIGITAL BOARD (PCB2) BOTTOM VIEW



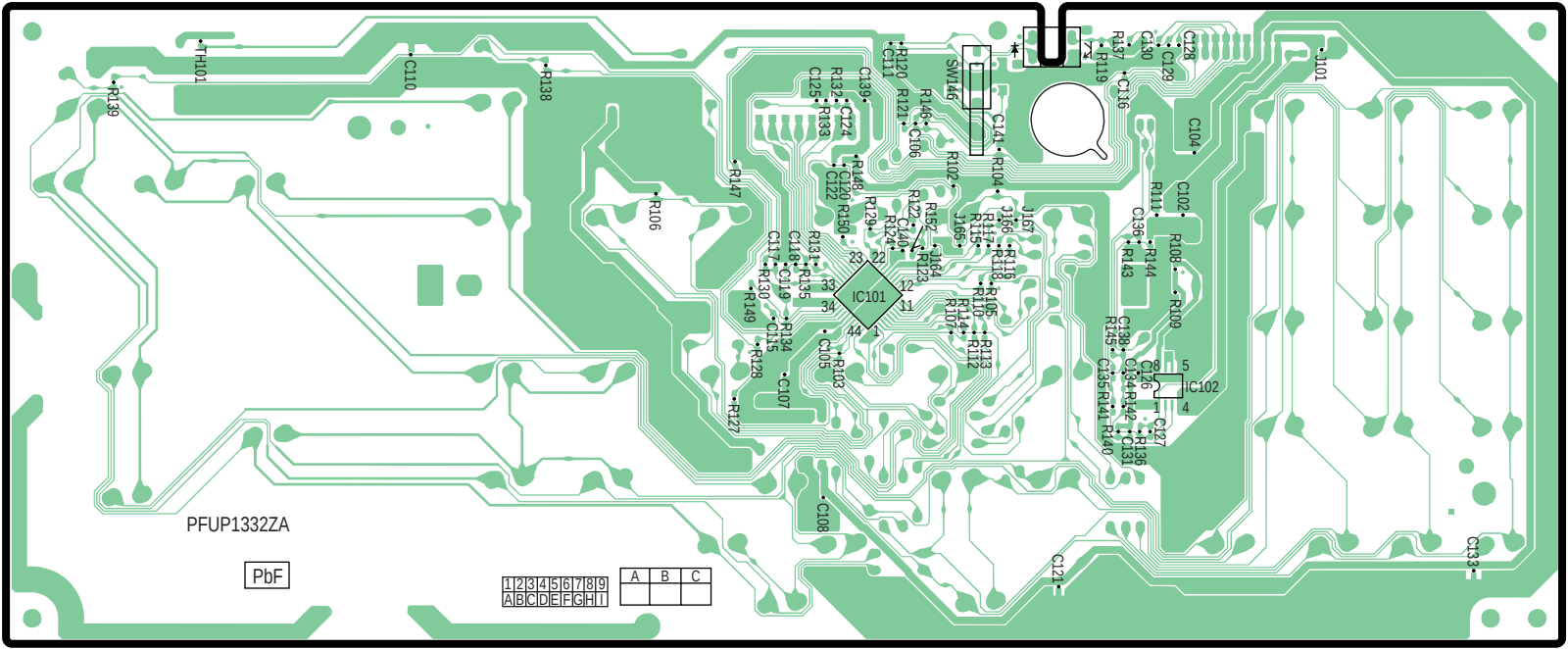
KX-FL541 ANALOG BOARD (PCB2) COMPONENT VIEW



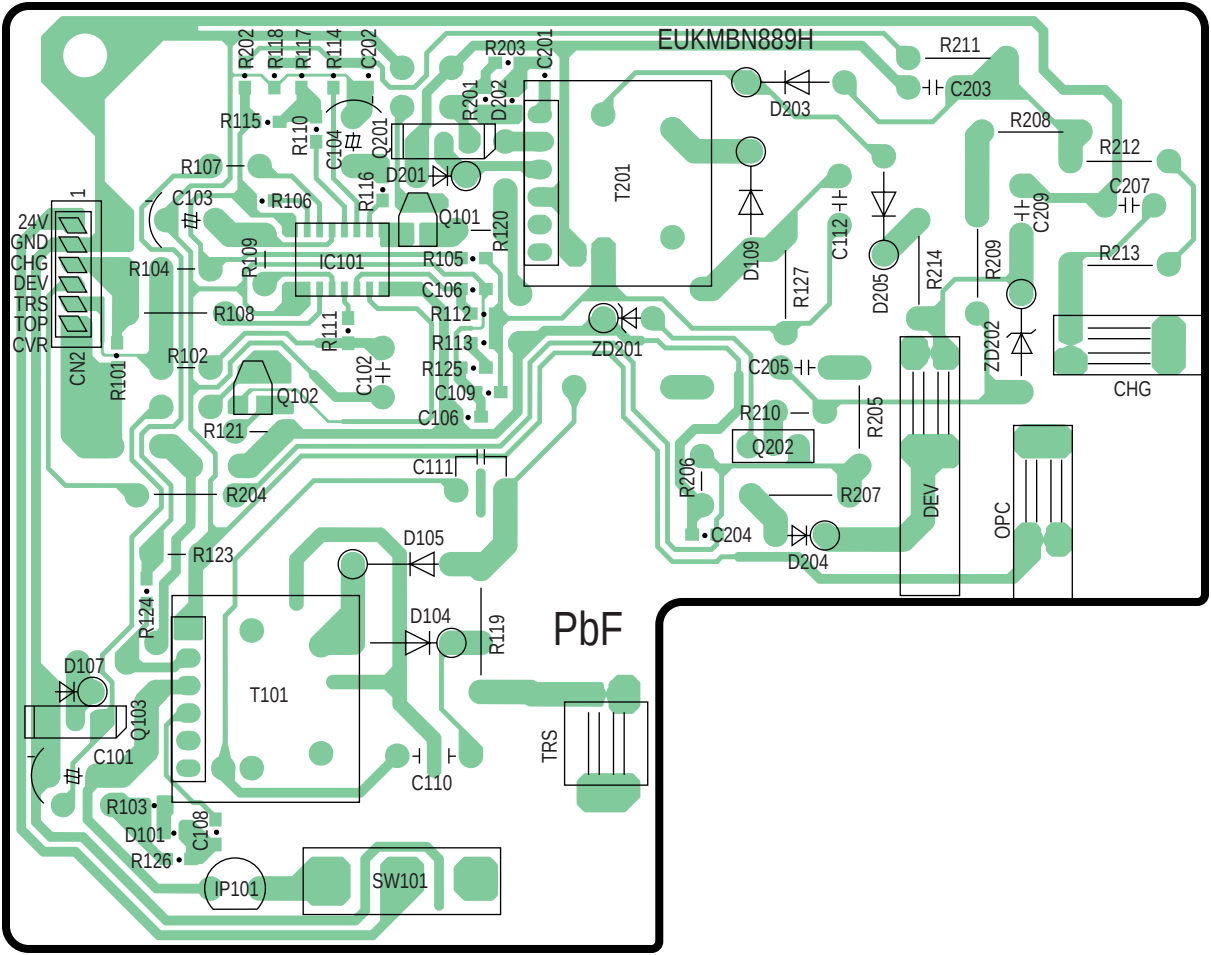
KX-FL541 ANALOG BOARD (PCB2) BOTTOM VIEW



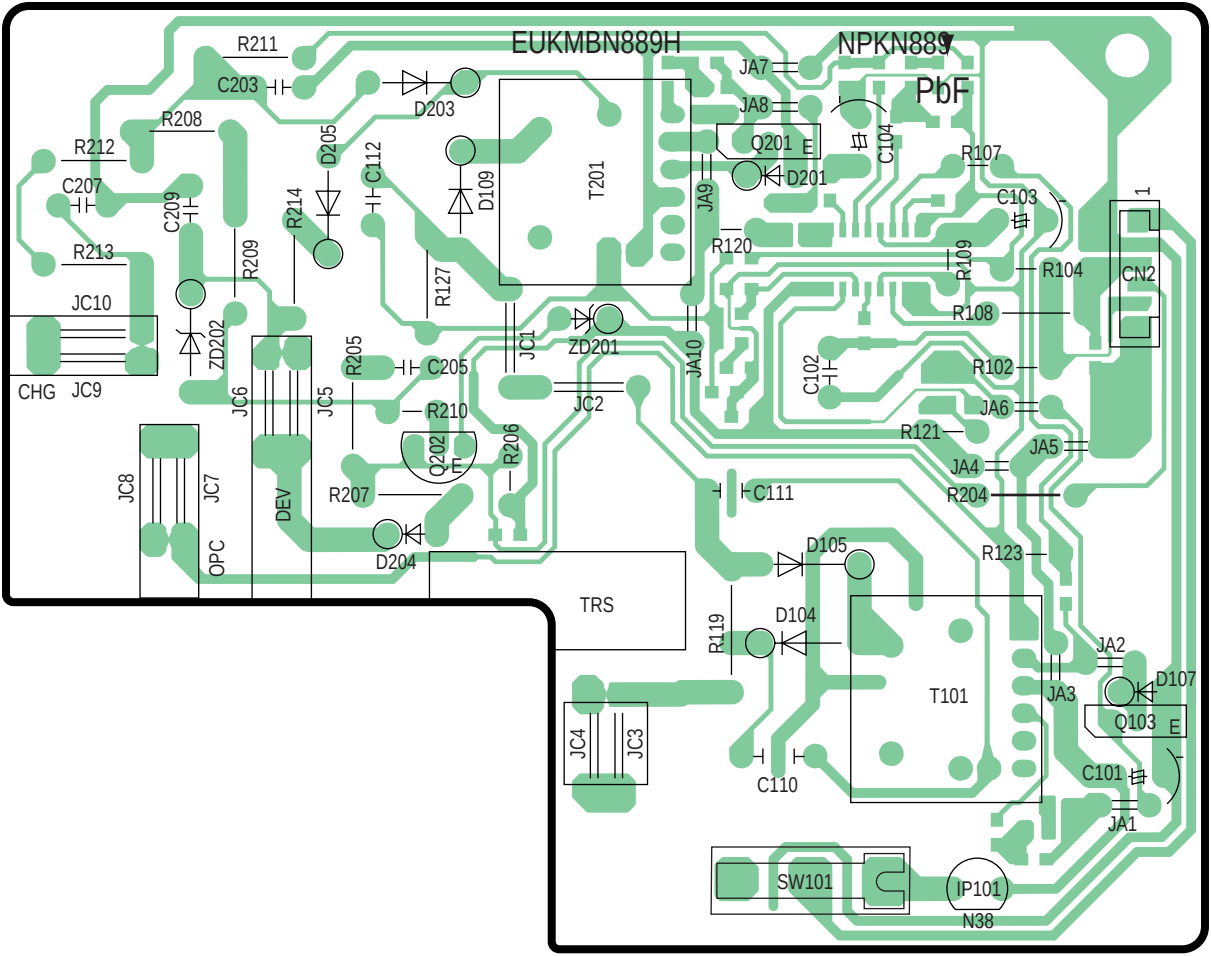
KX-FL541 OPERATION BOARD (PCB3) COMPONENT VIEW



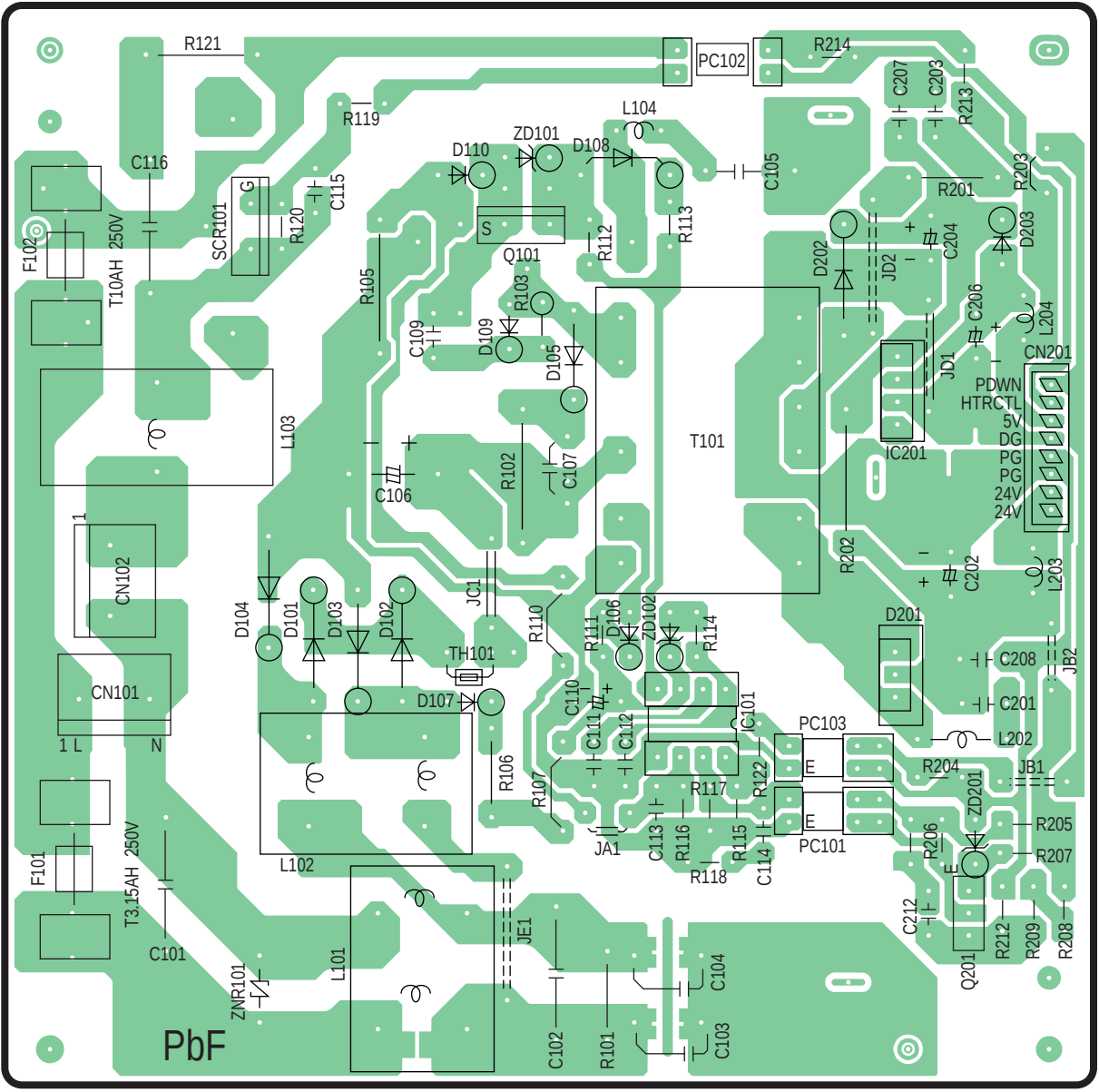
KX-FL541 OPERATION BOARD (PCB3) BOTTOM VIEW



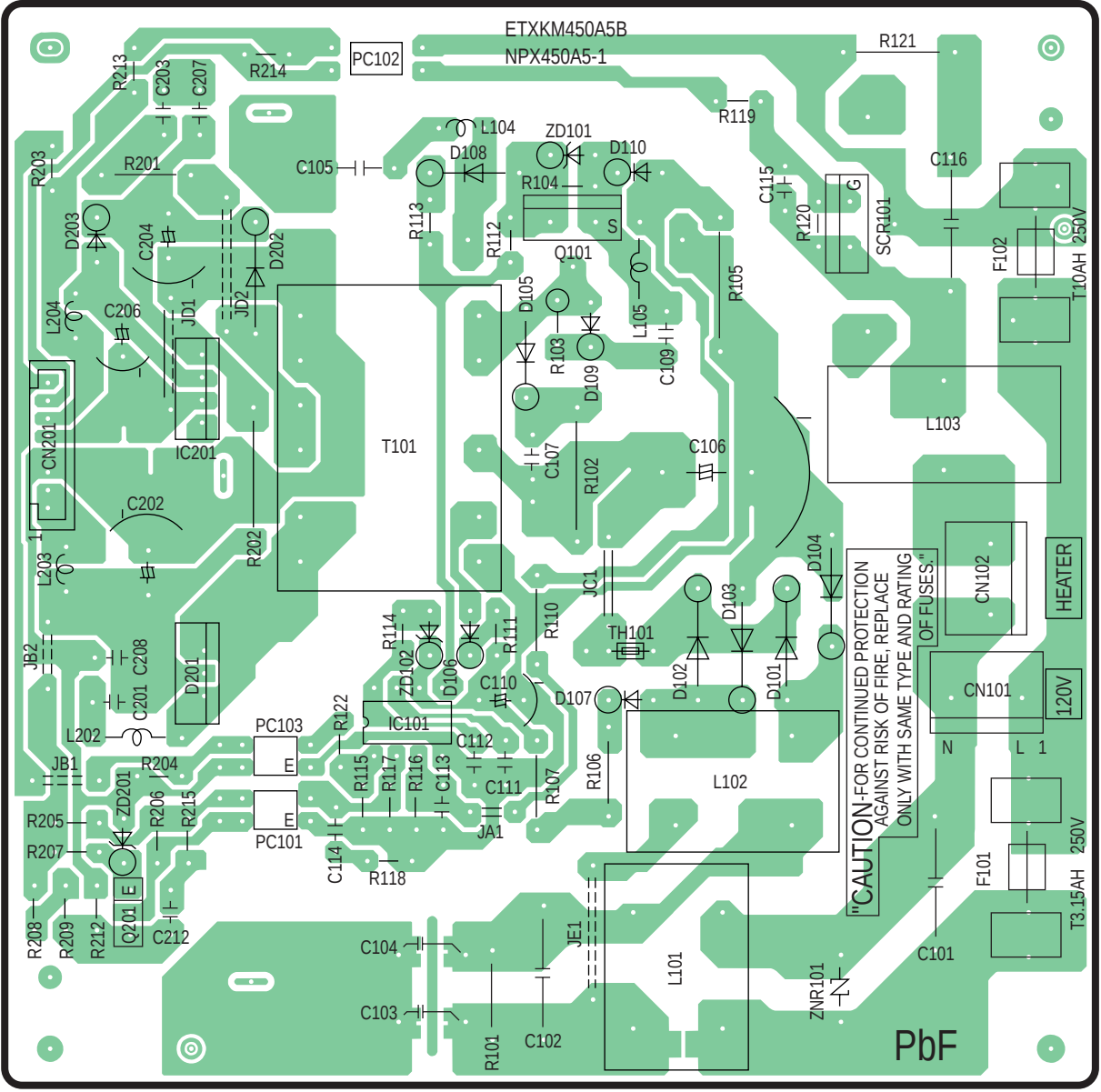
KX-FL541 HIGH VOLTAGE POWER SUPPLY BOARD (PCB4) COMPONENT VIEW



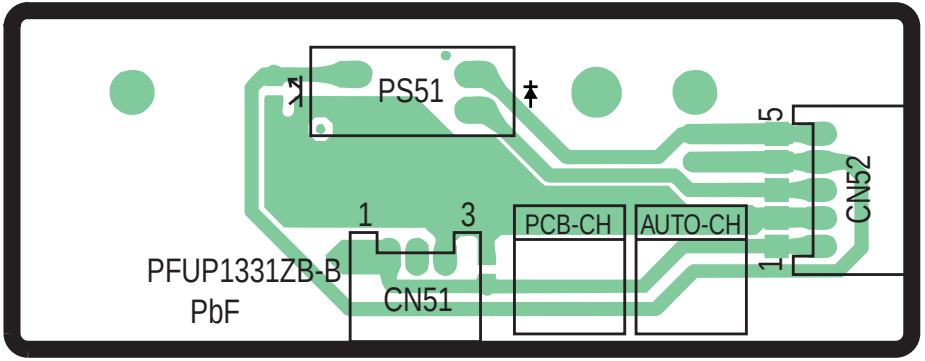
KX-FL541 HIGH VOLTAGE POWER SUPPLY BOARD (PCB4) BOTTOM VIEW

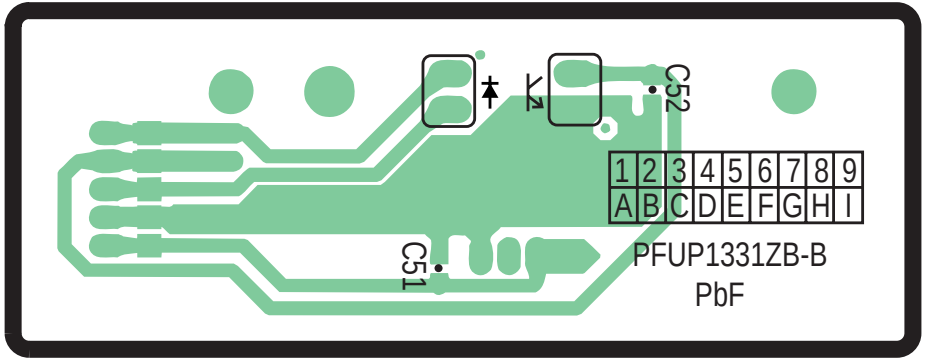


KX-FL541 LOW VOLTAGE POWER SUPPLY BOARD (PCB5) COMPONENT VIEW

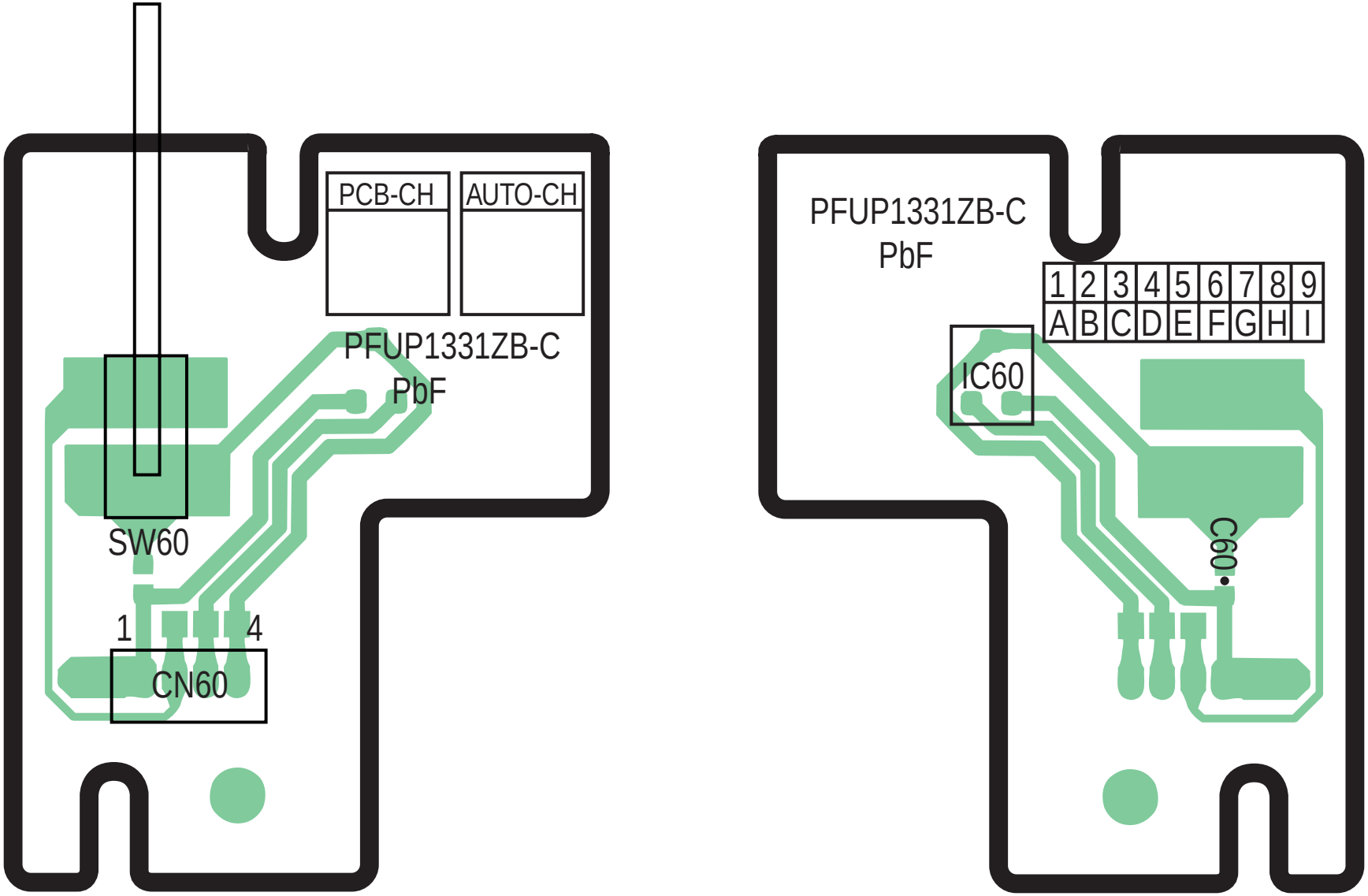


KX-FL541 LOW VOLTAGE POWER SUPPLY BOARD (PCB5) BOTTOM VIEW

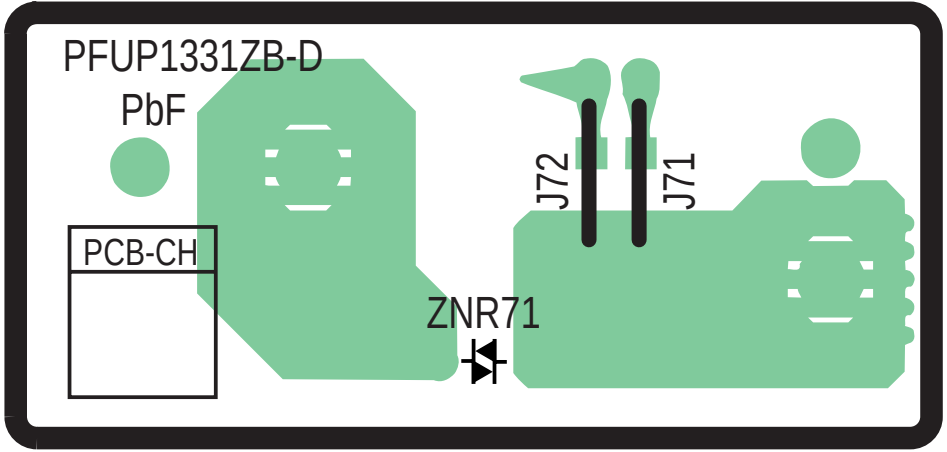


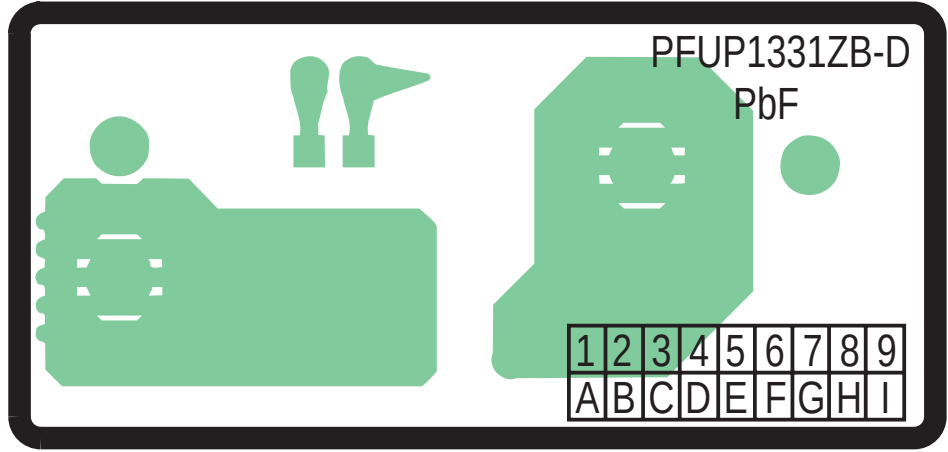


KX-FL541 EXIT SENSOR BOARD (PCB6)



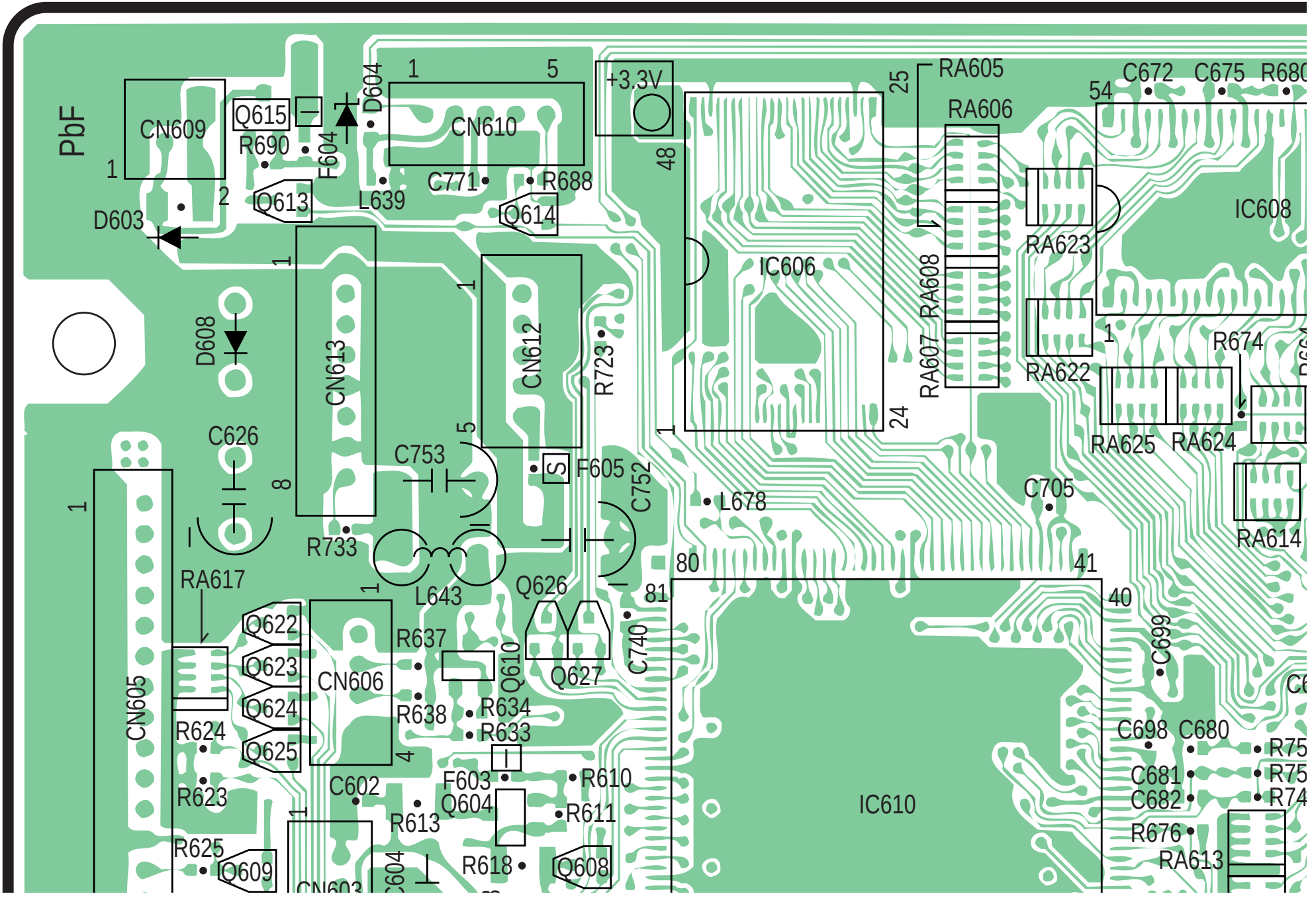
KX-FL541 DRUM AND TONER SENSOR BOARD (PCB7)

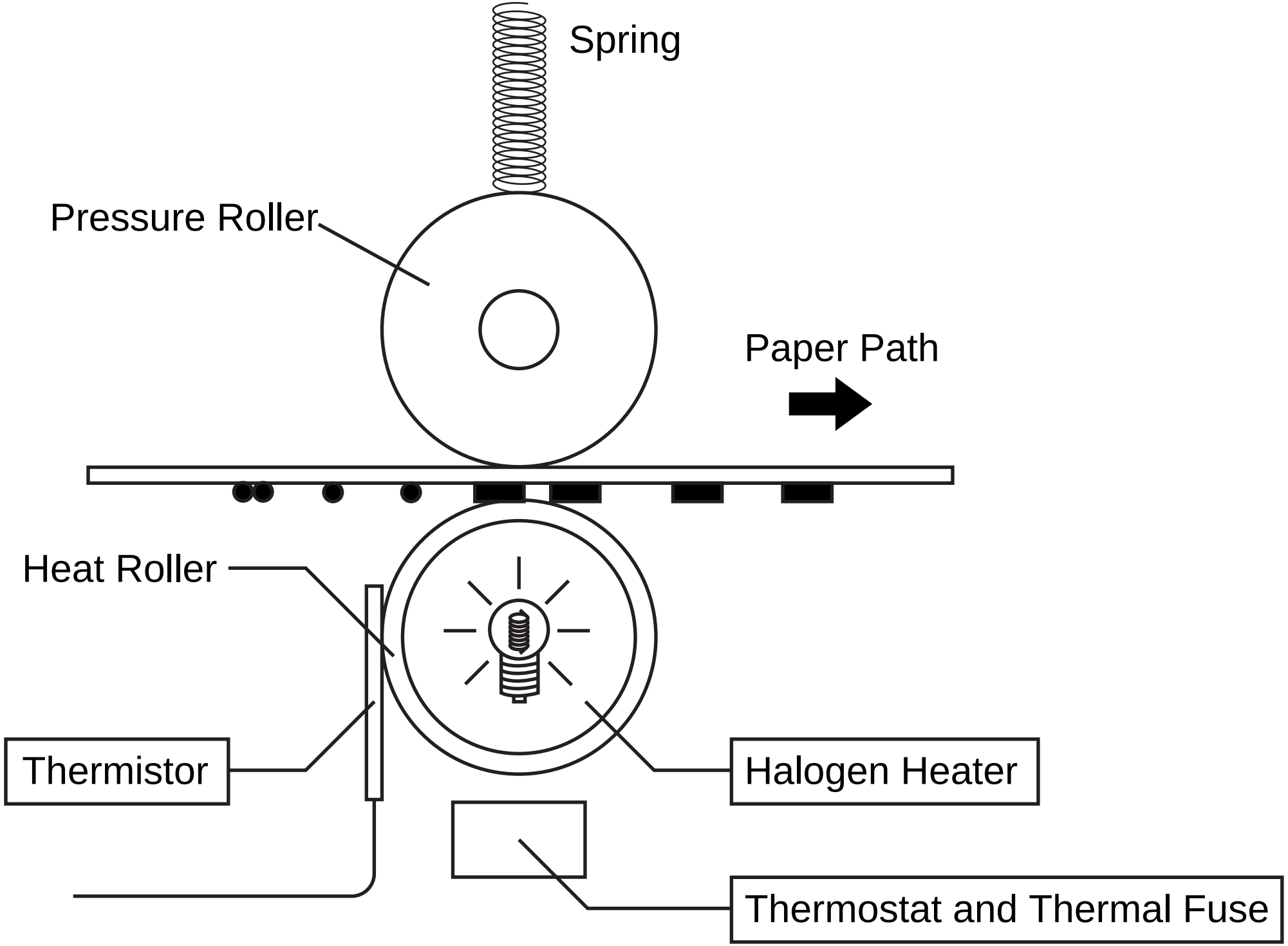


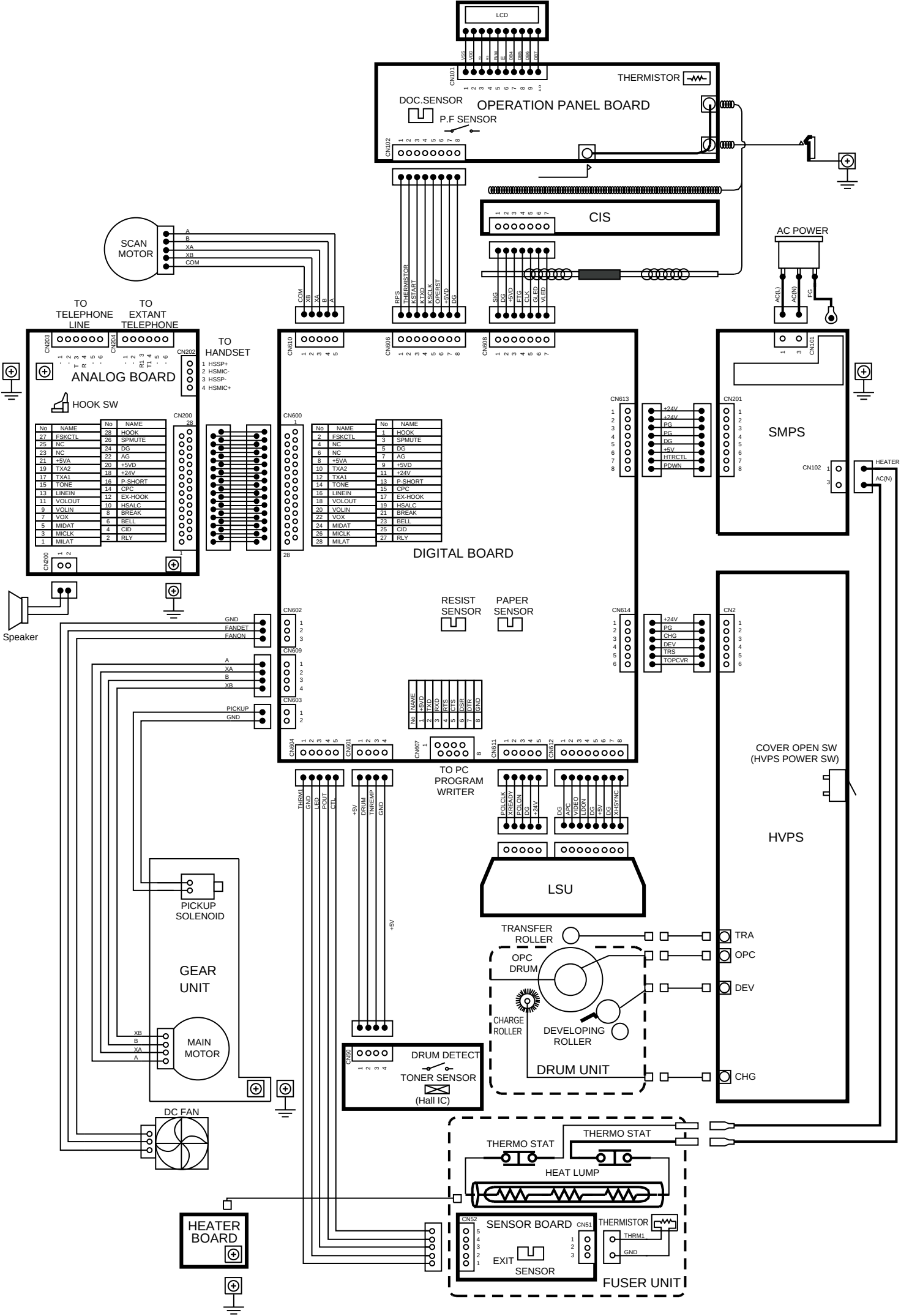


KX-FL541 VARISTOR BOARD (PCB8)

(Digital Board : Component View)




Spring
Pressure Roller
Paper Path
Heat Roller
Thermistor
Halogen Heater
Thermostat and Thermal Fuse

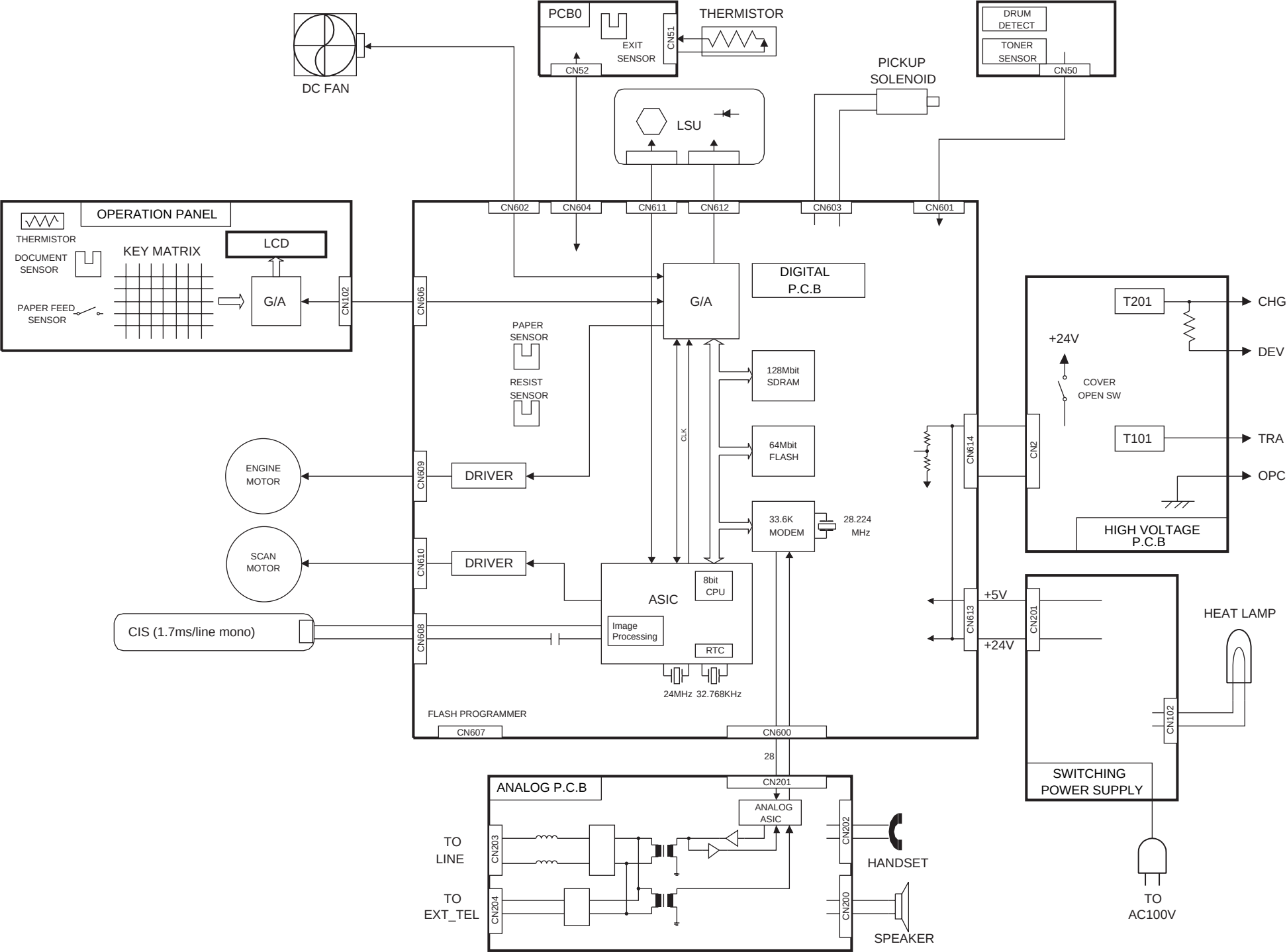


No	NAME
27	FSKCTL
25	NC
23	NC
21	+5VA
19	TXA2
17	TXA1
15	TONE
13	LINEIN
11	VOLOUT
9	VOLIN
7	VOX
5	MIDAT
3	MICLK
1	MILAT

No	NAME
28	HOOK
26	SPMUTE
24	DG
22	AG
20	+5VD
18	+24V
16	P-SHORT
14	CPC
12	EX-HOOK
10	HSALC
8	BREAK
6	BELL
4	CID
2	RLY

No	NAME
2	FSKCTL
4	NC
6	NC
8	+5VA
10	TXA2
12	TXA1
14	TONE
16	LINEIN
18	VOLOUT
20	VOLIN
22	VOX
24	MIDAT
26	MICLK
28	MILAT

No	NAME
1	HOOK
3	SPMUTE
5	DG
7	AG
9	+5VD
11	+24V
13	P-SHORT
15	CPC
17	EX-HOOK
19	HSALC
21	BREAK
23	BELL
25	CID
27	RLY


DC FAN
PCB0
EXIT SENSOR
CN51
CN52
THERMISTOR
DRUM DETECT
TONER SENSOR
CN50
PICKUP SOLENOID
LSU
OPERATION PANEL
THERMISTOR
DOCUMENT SENSOR
PAPER FEED SENSOR
KEY MATRIX
LCD
G/A
CN102
CN602
CN604
CN611
CN612
CN603
CN601
CN606
G/A
DIGITAL P.C.B
PAPER SENSOR
RESIST SENSOR
128Mbit SDRAM
64Mbit FLASH
33.6K MODEM
28.224 MHz
CLK
ENGINE MOTOR
CN609
DRIVER
SCAN MOTOR
CN610
DRIVER
CIS (1.7ms/line mono)
CN608
ASIC
8bit CPU
Image Processing
RTC
24MHz 32.768KHz
FLASH PROGRAMMER
CN607
CN600
28
T201
CHG
+24V
DEV
COVER OPEN SW
T101
TRA
OPC
CN614
CN2
HIGH VOLTAGE P.C.B
+5V
+24V
CN613
CN201
HEAT LAMP
CN102
SWITCHING POWER SUPPLY
TO AC100V
ANALOG P.C.B
CN201
ANALOG ASIC
TO LINE
CN203
TO EXT_TEL
CN204
CN202
HANDSET
CN200
SPEAKER